Legends no Histories:

OR, A

SPECIMEN

Of some

ANIMADVERSIONS

Upon the *HISTORY* of the

Royal Society.

Wherein, besides the several Errors against Common Literature, sundry mistakes about the making of *Salt-Petre* and *Gun-Powder* are detected, and rectified: whereunto are added two Discourses, one of *Pietro Sardi*, and another of *Nicolas Tartaglia* relating to *that Subject*. Translated out of *Italian*.

WITH

A brief Account of those passages of the *Authors Life*, which the *Virtuosi* intended most to censure, and expatiate upon: Written to save them the trouble of doing any thing besides *defending themselves*.

TOGETHER

With the PLUS ULTRA of Mr. *Joseph Glanvill* reduced to a NON-PLUS, *&c.*

BY

Stubbe, Physician at *W*

THe favorable Censure of the *Reader* is craved for what *Errors* have happ'ned in Printing, which the Authors leisure hath neither permitted him to prevent nor correct: However I am to desire that these two may be thus read, *viz.* In the 2 Pag. of the *Dedication*, *line* the 11. for (*your Supporters*) read (*their Supporters*) and *pag.* 105. *line ult.* read *Libavius*.

N. B.

The Preface to the Judicious

READER.

IT may perhaps, and that not *unjustly*, be wondered, that I should appear in behalf of the *Antient* and *Aristotelian* Philosophy, who have always been thought averse from *it*, and inclined to that which is more *Novel*. And it is true, that I have not such a *veneration* for the *Peripatetical Physicks*, as some others have, nor do I think *they* so *satisfactorily* explicate the *Phænomena* in *sublunary* things, as that an inquisitive brain can *acquiesce* therein: but this is not so mnch the *deficiency* of *that Learning*, as of *humane Nature*; the attempt it self being so *little feasible*, that *whosoever* shall design *any such thing*, shall involve himself in the *like miscarriages*, as appears from what *Gaffendus*, *Des Cartes* and others have done, from whose performances the *greatest* advantages we have yet derived is, that it seems manifest how *easie a thing* it is to find *defaults*, and how *difficult* to amend *them*; and how the *Man* of *Stagira* was not *singular* in his *faylors*.

If the *Cartesian* Hypothesis seem to be *demonstrated sufficiently* in *this*, that it is agreeable to the *general occurrents of Nature*, and solves the *difficulties* emergent, as if it were absolutely *true*: If this, I say, may pass for *sufficient proof*, I know not why a *Physician* may not submit unto the *like conviction*, who dayly *experiments* that the *Aristotelian* Philosophy (which with some little *discrepancie of opinions*, and *diversity of explications* hath been transmitted from the *Asclepiada*, *Hippocrates*,

How false that *Cartesian* assertion is, the learned and pious Dr. *More* hath in sundry pieces demonstrated.

Anton. vander Linden de circuitu sanguin. l. 2. q. 17.

Exercit. 5. Sect. 22 2. *Hieron. Mercurialis* de hom. generat. c. 2. *Andr. Laurent.* anatom.

and

and *Aristotle* to their *Alexandrine*, *Grecian*, *Sarracenical*, and *Christian* Physitians through so many *ages*, *revolations*, and different *Climates*) is most conformable to the *Subject* about which his *Faculty* is employed, the *explanation of Diseases*, *their Nature*, *their Symptoms*, *their tendency*, and *Cure*? Not only the *Chyrurgical*, but *Medicinal* part of *Physick* hath been carried on and *stated* upon those *general grounds*, and that with such *assurance*, that where any *learned* and *solid practitioner* of *that way* shall happen to be *at a loss*, those which are *enemies* to it, the admirers of the *Virtuosi* and of *Odowde*, have not been able to make any *considerable* advantage *thereby*. Most that the *Novellists* have done, is to find out *new reasons* for an *antient practice*, and to shew how the old *Meditaments* wrought to *their effects* in *another way* than was supposed: but they have neither discredited the *Medicines*, nor *Method* with any *understanding* men: Whatever *superlative discoveries* have been made of late, a short *time* and *tryal* hath convinced *us* of the *inutility* of the most famed *inventions* and *Theorems*; and the *tedious*, *costly*, *new Medicaments* have scarce continued to be *nine days wonder*. I speak not this out of *contradiction* I carry to these *Virtuosi*; it is the result of my thoughts after twelve years of *deliberation*, after *observations accurately made* in my *own practice*, and in that of other *antient* men: and as it is *known* how I never desired any thing so much as the *benefit of my Patients*; so I hope I may be believed when I protest that my *Ambition* and *Interest* both suggested unto *me* a desire of *atchieving Miracles in Physick*, if it had been *possible*. But, since whatever *repute* I have required I owe it to that *Physick* which hath descended down unto *this age* by the means of such as have been of the *Aristotelian* and *Galenical* way, I am but *just* unto those *Worthies* in thus declaring against their *puny Adversaries*, who deserve all that *contempt* wherewith we *depreciate* the *illiterate* and *fools*, when they tell us that the *Antient Method* will not qualifie *us* to *work*, or enable us TO CURE A CUT FINGER, may less discover the *nature*, and *course of Diseases*, the *operation of Drugs*, and the *right compounding of them* for the benefit of the *sick*.

Mr. *Glanvil* in his plus ultra pag. 7.

Mr. *Sprat*, pag. 317. and 327.

Although

Although that this Reason might sufficiently justifie me for what I have done, yet I had more powerful *inducements* which prest me unto this design; and those are the *exigences* of the *English Monarchy*; whereunto since the *good Providence* of *God* hath subjected us once again, it is the *prudence* of every particular person to contribute all he can to the support of it, against all such intendments as may either introduce *Popery* on the one side, (which renders the *Title* of our *King*, and his *power* precarious, and will subvert the whole *Commonalty* of *England* in their *Estates*, not to mention the *concern of our Souls*, and that *intellectual slavery* whereto we must submit) and against all *Anarchical projects*, or *Democratical* contrivances, whereof a *debauched* and *ungenerous* Nation is not capable, and which cannot take effect without such *variety of changes*, as no *sober* man will think upon without *horror*, nor any that is *wise* pursue as *feasible*. I do avow therefore that the *desire* I had to contribute what I could to uphold the *Fundamental Policy* of these *Kingdoms*, was the principal *motive* I had to write this Treatise: and that how *willing* soever I was otherwise to discharge all *intelligent* persons from the *insupportable* prating of these *Comical wits*, and to avenge *my own faculty* upon these *insolents*, yet the *circumstances* which I saw might create me *future troubles* and vexations were such, that nothing less than a *generous* and *necessary inclination to serve my Countrey* could have made me *despise them*. I have so *small a regard* for deep and subtle inquiries into *Natural Philosophy*, and the *intricate Methanisms* by which *this World* is *said* to be governed, that could *Physick* be unconcerned in *their debates*, could *Religion* remain *unshaken* amidst the writings of these *Vertuosi*, could that *Education* be carried on happily whereby the *Subjects* are qualified to serve their *Prince* in all *Negotiations* and *Employments*, and their *Countrey* in *Parliament*, I should not entermeddle: but, if we look

Whosoever would be satisfied about the *imprudence*, *vanity*, and *perniciousness* of all attempts to subvert the *Monarchy* of *England* now, and introduce a *Democracy*; I would advise him to read over the Political discourses of *Malvezzi* in *Tacitus*, disc. 3. *Boccalini* advert. cent. 2. advert. 30. *Paulo Paruta* disc. polit. c. 8. *Chr. Forstner*, in *Tacit.* l. 1. p. 3, 4, 5, 6. Ut verissime dixerit *Cosmus Medices* Cardinali *Salviato*, in tanta opum inæqualitate, morumque corruptione, *Florentinam* Rempub. non esse amplius *libertatis* capacem, quam optari potius quam sperari debeat. *The reasons why the last* Brutus *miscarried in his design, will convince any man.*

look *de facto* upon these *Experimental Philosophers*, and from too *fatal trials* judge how little *they* are fitted for *those trusts* and *management of business* by that so famed *Mechanical Education*: and if we consider how much this Nation owes to *Burleigh*, *Walsingham Jewel*, *Abbot*, *Perkins*, *Whitaker*, *Usher*, *Davenant*, *Casaubon*, &c. & that by complying with these *Novel projects* for the breeding up of *Youth*, we deprive our selves of all *our hopes* to see *such persons* either in *Church* or *State*; we must rise as highin our *resentments* against the *Authors of this History*, & Mr. *Glanvils* Book (where more than *one* or *two Virtuosi* that contributed unto it) as the *concerns* of the *present Age* and of *our posterity* can animate *us*. That *Art of reasoning* by which the *prudent* are discriminated from *fools*, which *methodizeth* and *facilitates our discourses*, which informs us of the *validity of Consequences*, and the *probability of Arguments*, and manifests the *fallacies of Impostors* and *Comical Wits*; that *Art* which gives *life* to *solid Eloquence*, and which renders *States men*, *Divines*, *Physicians* and *Lawyers* accomplished, how is this *cried down* and *vilified* by the *Ignoramus*'s of these days? What *contempt* is there raised upon the *disputative Ethicks* of *Aristotle*, and the *Stoiques*? And those *Moral* instructions which have produced the *Alexanders* and the *Ptolomeys*, the *Pompeys* and the *Ciceroes*, are now slighted in comparison of *day-labouring*? Did we live at *Sparta*, where the dayly imployments were the *exercises of substantial vertue* and *Gallantry*, and *men*, like *setting-dogs*, were rather *bred up unto* than *taught reason* & worth, it were a more *tolerable proposal* (though the *different policy* of *these times* would not admit it) but this *working* so recommended is but the *feeding of Carps in the Ayr*, the *weighing of a pike in water*, the *cooling of Wine with Sal Armoniac*, (published long ago by *Berigiardus*) the *guilt varnish* (no *secret* to some *Trades-men* in *London*) or the inventing of an *Ambling saddle*. As for the study of *Politicks*, and all *Critical Learning* together with *Church-History*, these are either *pedantical*, or *tedious* to those who have a shorter way of *studying Men*? Those *Metaphysicks* which the *constant policy of Christendom* hath found so advantageous, that without a *Miracle* we could not have born up against the *Heathen-Philosophers*, *Arrians*, *Sarracens*, and *Socinians*,

Mr. Sprat. pag. 324.

See Mr. Glanvill's plus ultra pag. 123. & pag. 118, 119.

Mr. Sprat pag. 341, 342.

Mr. Sprat pag. 326.

tians, and out of which we do so confound the *Papists*, these must be *laid aside*; and are we not then in a fit posture to encounter *Bellarmine*, and *Baronius*? I remit these things to the consideration of all *serious patriots*, and do earnestly desire that they would with attention read over *Campanella* concerning the *Spanish* Monarchy, *Ch.* 23. *pag.* 142. *ch.* 25. *pag.* 157. *ch.* 27. *pag.* 177, 182. and the last part of the *History of the Royal Society*, and maturely *whether* the *projects* of the *one* be not put in execution by the *other*.

I follow the English Edition of *Campanella*, and do recommend these places, especially the last *citation*, to every serious *Patriot* his consideration.

I doubt not but *this attempt* of *theirs* was *no part of the intentions of* their *Royal Founder*: I am sure the *publique utility* is more dear unto *Him* than the giving of some men an opportunity to *entertain their Melancholy*, and *divert their idle hours*, or to acquire the reputation of *Airy* wits and *Drolls*: if *He* be *their patron*, it is certain that *He* is the *Father of his Country*, and the *Head of the Church*; the *obligations* he hath to these are so *great* and so *near unto him*, that these little *Engagements* must give place thereunto: Nay, *He* hath herein been *Exemplary* to his *Subjects*, by withdrawing much of his *Encouragements*, and testifying frequently his *disesteem* of these *Experimental Philosophers*. Thus many of the *Nobility*, most of the *Physicians*, and other *understanding* and *serious* persons have either totally deserted the *Society*, or *discontinued* their presence at their *Assemblies*. And I could wish they would not *abuse* the World with *false Catalogues*, but give us a *true one* of such men as do *now frequent their meetings*, *keep correspondence with them*, and pay the *usual contribution*.

Having so great Presidents to justifie my *contempt* of *them*, methinks I need not apprehend the *censure* of those *Illustrious* and *Honorable personages* who might otherwise seem concerned in this *Quarrel*. The same *motives* which prompted them to advance the *Royal Society*, must now excite their *indignation* against them: the desire of advancing of the *Glory*, and the trading of *this Nation*, & of understanding *natural curiosities* engaged them in *this Society*, but now that these *men* have no way answered *their expectation*, since their *relations* and *Experiments*, are so *trivial*, *defective*, and false, since that the *Authors* of

this,

this fatal History have more in them of *Campanella*, than of Mr. *Boyl*; since they have relinquished the *original design*, and *deviated* so notoriously from the intention of the *Royal Founder*, and what those *Eminent persons* purposed, who *first* closed with *them*. I will not think *them* any more involved in this *contest*, than *patrons* are where *their favours are abused*. And I protest that I bring with me all the *respect* and *Honor* in the world for those *persons of Honor*, who in so *dissolute an Age* gave the world that testimony of their *generous intentions*, which was to design the *improvement of useful knowledge* by these men: And I am concern'd to see their *Gallantry* so abused, so that nothing *exasperated my peace more* than a *resentment for their Honor*: Had the *Experimental Philosophers* acquitted themselves in *their trust* better, yet ought I to have been *commended* for *animadverting* upon these *Books*: the *notorious untruths* and *Errors* against *common Literature* were such, that *Foreiners*, who inquire into the *Writings* and *transactions* of these *Comical Wits*, would have concluded that we were *universally* degenerated into the old *British* ignorance, and that the *Barbs* once more swayed in *this Land*: But I have taken off from the *generality of this imputation*; and dare presume that those that were no more than *Honorary Members* (and consequently not concerned in the *private* contests and *suits* of the *Corporation* they *so* stand related unto) will express a kindness for my *performance*.

Having thus excused my self to the *persons of Honor*, I shall briefly say something to those of *unquestionable Learning* that reside amongst the *Society*: I am sorry to finde *them* there, and that I must accommodate to their *worth* that Ancient saying, *Ingenium Galbæ male habitat*: their *number*, and *interest* seems so small there, that this *History* could pass with *applause*, notwithstanding *them*, and Mr. *Glanvil* be commended: with what *credit* can they resort unto the meetings of these *Comical Wits*, whose *ridiculous actions* reflect upon *them*, and upon which *Assembly* to bestow the *Elogies* of the *Learned*, or *Vertuous*, 't would be as improper in an *Aristotelian*, as to denominate an *Æthiopian* to be *white* because of his *Teeth*? He must be

be *insensible of all merit* that can derogate from Sir *Robert Murray*, Dr. *Wren*, or Dr. *Wallis*: and to suspect that the truly Honorable and *inquisitive* Mr. *Boyle* would abet a *design* that should subvert *piety*, and the *Protestant Religion*, doth not become any that knows *him*, or his *Writings*. But since *good men* are often-times made use of to *pernicious* ends, and *unwittingly* become *instruments* of the *basest frauds*; since none are to judge of *Affairs* by *their tendencie*, and not by the persons that *openly* manage *them*, I doubt not but even *these persons* and *others* of *integrity* and *solid worth* will not imagine themselves concerned in the maintenance of those *Errors*, which they cannot *approve* of, and every one knows *they could not commit*, nor *hinder*.

I have been thus large in the *Preface* to remove all *umbrages* and *misconstructions* to which this *undertaking* might subject *me*: the *Preface* also against Mr. *Glanvill* may seem a little *prolix* in comparison of the *subsequent Discourse*; but the *Specimen* being lodged at *London*, partly in *transcribing*, and partly because that the distance of the *Term* made the *Edition* less *seasonable*, I thought fit to inlarge that *Preface* much during my stay at *Bathe*, and to annex those other *Observations* made there, and what else is taken out of the Disputations of *Vander Linden* about the *Circulation of Blood*, which Book I could not procure the *sight* of before.

There be many defaults in the Language, and *connexion* of *passages* which may be liable to some *censure*: But whilst the *body of my Discourse* stands firm, the advantages which the *Comical Wits* shall derive from those *peccadilloes* will not be much: especially when I shall plead that the work was written amidst the *heat* of my *practice*: that the papers were not written, nor any discourse finished at *one time*, but with *frequent interruptions*: that the several *parcels* and *fragments* were sent to sundry *Learned* persons to experiment their *judgment*; that they were *joyned together* with some *alterations* and new *connexions*, without any review *of mine*, at *London*: several *additions* being to be inserted, as they came into my mind, in divers places, and so transmitted by the *post*: which occasioned

great

great trouble: in fine, had not ſome publique ſpirited *Gentlemen* there undertook to tranſlate the *Italian* pieces, and to ſee the work *tranſcribed*, and the *inſertions* made, and the *connexion* in ſome meaſure ſupplied, I could never had leaſure to finiſh my intendments.

After this piece there ſhall follow the next *Term* (if God give me leave to perfect what is almoſt finiſhed now) *A Vindication of* Ariſtotle *from the calumnies with which* Mr. Glanvill *hath aſperſed his perſon.* in his Letter which is joyned to the Edition of his *Scepſis Scientifica*, which bears the *Arms* and is *dedicated* to the *Royal Society*, : as *as he repeats again* and *again* the *ſame* things, ſo *he* is ſtill the *ſame illiterate perſon* : having never ſo much as read over *Diogenes Laertius*.

There are alſo *three Letters* of *mine* which may at ſome time or other become *publique*. The *firſt*, to a *perſon of Honor* and Member of the *Royal Society*, ſhewing how my writing againſt theſe *Comical Wits* doth not derogate from the *perſons of Quality* who are *Honorary Members* of the *ſame Aſſembly*: eſpecially ſince *they* have acted ſo much contrary to the intentions of thoſe *illuſtrious Patriots* that at firſt encouraged *them*; there are the paſſages of *Campanella* ſet down, and *commented* upon. & the third part of the *Hiſtory of the Royal Society* animadverted upon, as being directly ſubſervient to *his Propopoſals* for the reſtoration of *Popery*, with ſome acceſſional Characters, which Mr. *Sprat*, and Mr. *Glanvil* beſtow upon the *uſeful Univerſity* Learning.

The ſecond, to a *perſon of Honor*, no Member of the *Royal Society*, ſhews, that it is *impoſſible* to arrive at any *exact Science* in *Natural Philoſophy*; that if it were poſſible, yet theſe *Comical Wits* and their *Method* could never atchieve it: I ſhew how their *negligence* in making *obſervations*; their *falſhood* in relating them: that they either are *ignorant* of what is publiſhed by *Antient* and *Modern Writers*, or moſt *egregious plagiaries*: that the *Ariſtotelians* and *Galeniſts* were never enemies to *Experiments*, but cautious about *concluding* any thing *raſhly* from them, or making ſuch as were unſafe and inconſiſtent with *good conſcience*: and that the *Experiments* recorded by the *Ancients*

Here I further purſue Mr. Sprat for the miſtakes againſt *common Literature*, with which the *Hiſtory* abounds

lenical Physicians infinitely surpass as to *Physick*, and even *Natural Philosophy*, what ever these *Comical Wits* can pretend unto. I add, that the *deep* study of *Natural Philosophy* is not *requisite*, but rather *destructive* to all *Polities*, (as appears by *History*) neither is that or the *Mathematicks* necessary to the improvement of *Manual Trades* and *Arts*, since those *Countries* where *Philosophy* and *Mathematicks* have been *generally ignored*, (as in *Asia*, and during the times of the *Romans* luxury) *Mechanical Artisans*, and such Manufactures have *most flourished*: that the *Luxury* which is now in *fashion* hath nothing in it that may compare with the *ingenuity* of the Antient *Vertuosi*: that those of old *Rome* did make an *Icarus* to fly, and in his flight to fall down and besprinkle *Nero* with his Blood; whereas our *Fopps* have been these many years studying how to flie, yet have not so much as effected the most facile part of the attempt, which is, *to break their necks*.

The third is to a learned *Physician*, shewing the damages *our Faculty* hath sustained by these *impertinents*: the condition of *Physick* and *Chyrurgery* as it is at present by reason that the *Divines*, *Mountebanks*, *Quacksalvers*, *Apothecaries*, and every rude *Experimentator* countenanced by the *principles* and repute of these *Virtuosi*, all *practise it*: the inconveniences to the *Monarchy* thereby are considered, and the unreasonableness of what the *Virtuosi* alledge, as also the *vanity* of sundry of their *Experiments* (besides what are *old*, and *impudently* obtruded on *us* for *new*) is demonstrated.

And if there be any person *worthy of my indignation* that will justifie the *Rhetoricalness* of the *History of the Royal Society*, I will write a fourth about *that*, shewing that *choice of words*, and *smooth* and *numerous period* is not *compleat Eloquence*; but if the Subject-matter be *foolish* and *irrational*, 'tis a sort *of madness* in the judgment of *Tully*: and that if all the instances of *puerile* & *jejune Eloquence* were lost, which are recorded by *Seneca* and *Quintilian*, I protest I could supply a great part of *that damage* out of this famed *History*: and if any fitting *Adversary* declare herenpon, I will make these *Comical Wits* as much renounce the *Antient Orators*, as they do now the *Philosophers*.

I ſhould here put an end to this *Introductory* diſcourſe, but that 'tis fitting the world ſhould know how not only *illiterate*, but *mean-ſpirited* theſe *Vertuoſi* are: when I declared that I would *animadvert* upon Mr. *Sprat*, and Mr. *Glanvill*, theſe *Comical Wits* not only intimated to *me*, but in all places divulg'd that if I attempted any ſuch *thing*, they would appoint ſome *ingenious men of their number* to write *my Life*, thinking hereby to *terrifie* me, and make me fear their *Satyres*, who deſpiſed their *Learning* and other *abilities*. The effect of *this their project* was ſuch, that I found *all perſons of Honour* and *ingenuity* to condemn it *univerſally*: pitiful *Mechanicks*, that being ſo ridiculous already, multiply occaſions of further *contempt*! The courſe is uſual amongſt the *Papiſts*, and *therefore* leſs to be admired or ſtrange in theſe *Virtuoſi*. When the Biſhop of *Spalato* writ his excellent Books againſt the *Romaniſts*, they anſwered him by *calumniating* his *life*: when *Padre Paolo* writ the *Hiſtory* of the *Council* of *Trent*, the Jeſuit *Palavicini* begins his *Anti-Hiſtory*, with a long debate, wherein he attempts to prove that the *Author* of the ſaid *Hiſtory* was an *Heretique*, and *Atheiſt*. This procedure of his hath been *laughed* at every where, and *Cæſar Aquilinius* a *Papiſt*, thus cenſures it.

Cæſar Aquilinus de tribus Hiſtoricis Concilii Tridentini, p. 18, 19, 20.

"An *Petrus Soave* fuerit Hæreticus an Atheus? *Queſtionem hanc proposuit* Henricus *initio præfationis ad ſuam* Cenſuram, *loquens enim de* Petro Soave, *hæc addit*, Scriptor Hæreticus an Atheiſta? *nihil oportet inquirere: quare ipſe Queſtionem hanc ut ſuperfluam contemnendam potius quam examinandam & determinandam judicat.* Palavicinus *vero exiſtimans ſtatim uno ictu adverſarium, atque ejus* Hiſtoriæ *ſternere auctoritatem, Quæſtionem iſtam proponit, & ſolvit, aſſerens in primo introductionis ſuæ limine* Petrum Soave *fuiſſe* Hæreticum, *& quod pejus eſt*, Atheum: *hoc etiam addit ſecundi voluminis initio in epiſtola quam tribuit ſui operis* Bibliopolæ. *Probat hoc ex quibuſdam verbis Manu ſcriptarum epiſtolarum, quæ juxta ejus ſententiam* Petro Soave *tribuuntur*. Verùm ſatis ſultè videtur incedere, & aſſimulatur ei, qui umbram inſequitur relicto corpore: *habet præ manibus* Hiſtoriam Concilii Tridentini *ſcriptam ab illo & typis datam, in qua tanquam in ſpe-*

culo

" *culo posset cognoscere, quenam sit* Petri Soave Religio. *An Ca-*
" tholicus, *an* Hæreticus ? *An fortasse* Atheus ? *& laborat a-*
" *pud nonnulla privata manu scripta, quæ vel vera non sunt, vel*
" *certe ancipitis expositionis.* —— *Primus igitur* Palavicini
" *ictus satis* vanus *&* inutilis *est, & ipse videtur assimilari ho-*
" *mini, qui cum non valeat* suis viribus *inimicum vincere, utitur*
" *clarioribus, &* maledicis vocibus : *debuisset solum respondere*
" *ad opposita, quæ in illius* Historiâ *inveniuntur, & non lacessere*
" *hostem injuriis &* imitari prudentiores, *ac* Sanctos Scriptores
" *adversus* Hæreticos, *qui relictis injuriis tantum eorum doctri-*
" *nam confutant ac damnant.* ——

In fine, I was so far from being daunted at *those rumors* and *threats*, that I enlarged much *this Book* thereupon, and resolved to charge the *Enemy* home, when I saw how *weak resistance* I should meet with. I knew that *recriminations* were no *answers*; and that a *sober vertue* needed not to stand in fear of any *aspersions*. I understood well that the passages of a *life* like *mine*, spent in *different* places with much *privacie* and *obscurity*, was *unknown* to *them*; that even those *actions* they would fix their greatest *calumnies* upon, were such as that they understood not their *grounds*, nor had they *learning* enough and *skill* in *casuistical Divinity* to *condemn* : that it would be *imprudent* in *them* to look beyond the *Act* of *Indemnity* and *Oblivion*, which was more necessary to many of the *Royal Society* than to me; nor can *their deportment* be *justified*, as *mine*, who joyned with *no party*, frequented no *Conventicles*, writ very *honorably* concerning the *Episcoparians*, and pleaded for their * *Toleration* : I was at *Westminster-School* when the late *King* was *beheaded* : I never took *Covenant*, nor *Engagement*. In sum, I SERVED MY PATRON; I endeavoured to express my *Gratitude* unto *him* who had *relieved me* being a *Childe*, and in great *poverty* (the *Rebellion* in *Ireland* having deprived my Parents of all means wherewith to *educate* me) who made me a *King*'s *Scholar*, preferred me to *Ch. Ch. C.* in *Oxon*. who often supplied me with money, when my *tender years* gave him little hopes of *any return*, and who protected me amidst the *Presbyterians* and *Independants*, and other *Sects*, with none thereof did I

'Tis a kind of *Impiety* to disturb the buried : and oftentimes the exposing of things to the Air that have been long kept *close*, or the opening of *Tombs*, hath raised vapours so *pestilential* that they have almost ruined flourishing *Kingdoms* and *Seigniories*.

* See my preface to the *Good Old cause*.

contract any *relation* or *acquaintance*: my *familiarity* never engaged me with *ten* of that *party*, and my *genius* and *humor* inclined me to *fewer*. *I* neither *enriched*, nor otherwise *advanced* my self during the *late troubles*, and shared the common *odium*, and *dangers*, not *prosperity* with my *Benefactor*. *I* believe no generous man, who hath the least sense of *bravery* will *condemn me*; and *I* profess, *I* am ashamed rather to have done *so little*, than that *I* have done *so much* for *him* that so *frankly obliged* a *stranger*, and a *childe*. When *Gracchus* was put to death for *sedition*, that faithful friend and *complice* of *his* was *dismissed* and mentioned with *honour* by all Posterity; who when he was impeached, *justified his Treason* by the avowing a *Friendship* so great, that whatever *Gracchus* had commanded him, he would not have declined it: and being further Questioned, *whether he would have burned the Capitol at his bidding*? He replied again, *That he should have done it*; *but* Gracchus *would not bid such a thing*. They that knew *me* heretofore, know I have a *thousand times* thus apologized for my self: adding, that in *Vassals* and *Slaves*, and persons *transcendently obliged*, their *Fidelity* exempted them from *all ignominy*, though the principal *Lords*, *Masters*, and *Patrons* might be accounted *Traytors*. And *I* am so far from dreading the *Censure* of the *world* (especially from *Cavaliers*) that *I* believe most men wish their favours so well placed, and that in their *exigencies* they might meet with as *brave* acknowledgments. My *Youth* and other circumstances *incapacitated* me from rendring him any great *Services*; but *all that I did*, and *all that I writ*, had no other aim than *his interest*; nor do *I* care how much any man can *inodiate my former Writings*, as long as that they were *subservient* to *him*.

* * *

I think this defence to be the most *proper* and *seasonable* that I can now make; and *I* will not suffer my self to be engaged in any *Disputes* that may contribute to the *disettlement* of this *Nation*, and *Monarchy*; it will therefore be but meanly done to

to *assault* what *I now abandon*; and to revive the *mention*, nay, perhaps to contrive *any answer* (after so many years omitting it) is scarce *prudential*. *I* have been *confirmed* by the *Right Reverend father in God* the Lord *Bishop* of *Winchester*, and they that would write *my life well*, must consult that excellent *Prelate*, and a Letter which *He* hath of *mine*: *I* have lived in *Communion with the Church of England hitherto*, as standing upon the foundations laid by Qu. *Elizabeth*; and my neighboring *Diocesans* of *Worcester* and *Lichfield* can certifie with how much respect I have demeaned my self *to them* upon occasion; and *I* abhor all *thoughts* but such as shall contribute to the *support* of the *Monarchy*, the *Protestant Religion*, the *Honor* and *welfare* of *these Kingdoms*. Having made this Declaration, let them (or more able men than *they*) write against any piece of mine which hath been published since his *Majesties restoration*, and consider the *manner of my assertions*; and let them write the life of a *man* who hath *some vertues* of the most *celebrated* times, and hath reserved himself free from the *Vices of these*, *I* shall not regard their malice, nor value the *indulgence* of a sort of people whose credit (since the Answer to Mr. *Sorbier*, the *History of the R. S.* the *Calumnies* against *Aristotle*, and the *Plus Ultra* of Mr. *Glanvill*) cannot equal that of *Amadis de Gaule*, King *Arthur*, *Timæus*, or *Schioppius*. All that *they* shall say of this *nature* will be *notorious*, and *illiterate malice*; and my Reply shall be a *scornful silence*.

I shall add now, that in such times as I thought it *our interest* to subvert the *Monarchy* of *England*, and the repute of the *Clergy*; I was passionately addicted to the *new Philosophy*, and motioned several ways for the introducing it amongst the *Gentry* and *youth* in this Nation; I was confident that it would render all the *Clergy* contemptible, and take from their *esteem* and *reverence* in the *Church*, whilst they must seem *egregious fools* in matters of *common discourse*; nor did *I* question but the *Authority* of all *Antiquity* in spiritual affairs would vanish when it appeared how much they were mistaken in the *common occurrences* and *Histories of Nature*. How rational this opinion of *mine* was, and how it is verified in these days, let the *Hierarchy* and *Universities* judge.

To

To the two famous *Univerſities* of this Land, *Oxford* and *Cambridge*, the *Chancellors*, *Vice-Chancellors*, *Heads* of *Colledges* and *Halls*, *Profeſſors*, *Fellows*, and *Students* in the ſame.

Reverend *Fathers* and *Gentlemen*;

THe *goodneſs of the* Quarrel *I am engaged in makes me fear no* Judges; *but yet to chuſe the moſt* competent: *I am* ſecure *of the honeſt and* true; *but ſubmit the* deciſion *to the* learned *and* prudent. *All that are ſenſible of thoſe* ſtudies *by which the* Morality, Religion, *and* Civil Policy *of this* Nation *hath been carried on* happily *before theſe* Impertinents & Innovators; *and how* this Nation *is declined and* debauched *from every thing that is* ſerious *and* ſober *now, are convinced of the* juſtice *of* my complaints, *and how* neceſſary *it was that* ſome body

body *should attacque* them ; *but it is for* you *to determine of the* validity *of my* charge, *and of those* proofs *with which I come to implead* them. *I am not* troubled *at the* glorious Titles *with which these* Comical Wits *boast themselves ; Of the* Lyons *which they* bear, *they have only* this *faint* resemblance, *that* they are not so brave as they are painted *I have stooped the* Talbots (*your* Supporters) *for* them, *and if they ever* hunt well *hereafter*, this Age *knows* whom *they are* obliged *unto. The name of* Virtuoso *signifies as little with me, as it does in* Italy, *where they will bestow on a* Pastry-Cook *or* Millener, *even with that* fair *accessional of* molto Illostre; *But it seems a little too* open *and* palpable *to fetch the* project *of the* Society *from* Italy, *and their* name *too : though* Campanella *contrived the* former, *yet would* He *not have advised* them *unto the* latter ; *and if their*

their invention were ſo barren *as not to ſuggeſt unto* them *a fitting* denomination, *they might without robbing* meaner Artizans, *have borrowed* one *from the* Academy *of* Perugia, *or ſome where elſe there, and ſtiled themſelves the* INSENSATI, &c. *It is manifeſt now that the* Antient Learning (*and not only the* Natural Philoſophy) *is the* Rubbiſh they would remove; *This work they have ſo diligently purſued, as if they had forgot* "*Their* firſt and chief Employment, "carefully to ſeek, and faithfully to "report how things are *de facto* —— *This* Specimen *acquaints* you *with what* integrity *they perform their* undertakings; *and if the* Enſamples *they exhibite to the world, whilſt* They *are yet* probationers *for the glory of* Natural Philoſophers, *if they be ſo* faulty, *what* eſtimate *may we* rationally *make of thoſe that are laid up in the* Treaſury

Mr. Glanvil. pag. 91.

ry *of their* Archives? Mr. Glanvill *tells us, that* "They have done more "than all the Philoſophers of "the notional way, ſince *Ariſtotle* "opened his ſhop in Greece: which "ſaying (*he adds*) may perhaps look "to ſome like a bold and fond ſen-"tence; but whoſoever compares the "*Repoſitory* of this *Society*, with all "the volumes of the Diſputers, will "finde it neither immodeſt nor un-"juſt; and their Hiſtory hath given "us inſtances ſufficient of their *Ex-*"*periments* and *Obſervations*, and *In-*"*ſtruments* to juſtifie a bolder affir-"mation. ----- *I am indeed apt to be-lieve that all the* Philoſophers *of the* notional way *in* Greece, Alexandria, *A*rabia, Spain, *and the reſt of* Europe, *neither have, nor would have attempted anything* like to what they have done; *and when I reflect upon the lamentable narratives and propoſals which their Hiſtory,*

pag. 90.

I ſhall hereafter give the world an examen of the reſt of the hiſtory: and I, deſign to try them by that piece.

History, the Transactions and other Books of theirs represent unto us, I think they purpose to grow famous, as the Turks *do to gain Paradise, by treasuring* up all the waste paper they meet with. *But I shall not anticipate* your censure, *nor endeavor to prepossess* you *against* them *by the sense of* your interest, *nor exasperate* your passion *any way: Be as* unbyassed *as it is possible; Be as* Loyal *and* Monarchical, *as any* English-man *imaginable; Be as great* friends *as* you *can to the* Protestant Religion, sober vertue, *and the* real Honor *and* utility *of* these Kingdoms; *I wish for* such Arbitrators; *and your* Sentence *shall never be declined upon* those accounts, by

Warwick *Octob.* 6. 1669. Your affectionate humble Servant.

Hen. Stubbe.

A

Specimen of the *Animadversions* upon the History of the *Royal Society*.

EPicurus and those of *his followers* which declined the (*a*) entermedling with such employments as related unto the *Government* of their *Countrey* and *Civil Policie*, did agreeably to *their* inclinations and principles, slight and vilifie all that *vaidia* or (*b*) *course of studies* consisting of *Grammar* (which in its extent included all *Critical Learning*, *History* and *Chronology*) and *Rhetorick*, and *Logick*, and even *Mathematicks*. That great *Epicurean Philosopher Metrodorus* had the confidence to (*c*) write unto one, that *whereas he was ignorant of the first Verse in* Homer, *and understood not whether* Hector *were a* Trojan *or a* Grecian *Commander, nor any of those things almost which were the subject of common discourse and knowledg, yet he should not be* troubled *thereat*. We have seen in *this Age* not only the *Philosophy*, but the *Ignorance of that Sect* revived, but with this *disparity*, that whereas the *former Epicureans* did own & avow their being *unacquainted* with that sort of *Literature*, our *Modern Insolents* pretend to understand *it* in such perfection, that the *Empire of Learning* as well as of *wit*, and *solid Philosophy* should seem included in the *same walls*. But how *vain* such their *pretensions* are, and how justly I charge *them* with the *imputation* of *ignorance*, is apparent to any that are conversant with the *Books* that wear *their Name*, and by their *ordinary Discourses*. I shall vindicate my *Censure* by instancing in *those pieces* which had more than one *Comical Wit* to pen *them*, and *which* if they be not the most *elaborate* & *substantial* that it is possible for *that sort of men* to produce, the world must suspect henceforward *their discretion*, as much as now their *abilities*. The *History* was *many years* in writing, and the *Author* assures us, he had no *mean assistants* in that work: Mr. *Glanvill* wanted not a *convenient* space

(*a*) Vide Diogen. *Laert.* l. x. & notas *Menagii* pag. 275. Vid. *Diog. Laert.* ubi supra. *Menagii* notas pag. 260. 274. & *Vos.* de Phil. Sect. c. 8 *Sect.* 2, 3, 7.

(*c*) *Plutarch.* in libello *quod non potest suaviter vivi secundum Epicurum.*

ſpace of time to perfect his *Plus ultra*; he conſulted with ſeveral of the *Virtuoſi* for materials wherewith to advance their *Renown*, and ſilence not only his *opponent*, but all *oppoſites* againſt the *Royal Society*. I know ſome that *he* writ unto about it; and others ſaw *his papers* as they were remitted unto him, *blotted* and *altered*. The reſult of all which *their care* and *pains* is, that whereas *ſome* only *imagined* that *theſe men* were a company of *talkative* and *ſuperficial* —— now it is become *paſt denyal* by any body. Who can with *any patience* read how this famous *Society* ſent to the Governor of *Batavia* in the *Eaſt-Indies* to know what grows in *Mexico* in the *weſt-Indies*? How poor and mean are their *inquiries*, not ſuch as *ſerious men* deſign to erect a *Natural Philoſophy* upon, but to yield *empty fellows*, and the *Impertinents* matter for *Table-talk*! Juſt ſo when I went to *Jamaica* and deſired that Honorable Perſonage Mr. *Robert Boyle* to procure me *ſome directions* for *Philoſophical* inquiries in *that Countrey*; He, with *bluſhing and diſorder*, tendered me from *them* a *ridiculous* paper which concerned moſt ſome particularities of *China*, and thoſe *Oriental* parts: Had not that paper been *loſt*, I would have printed it; but if *they* pleaſe to remember *it*, it is about *half a ſheet of Inſtructions* given to an *Eaſt-India* Captain, and beyond any *Almanack* were to ſerve for all *Meridians*, and *Countreys*, though the enquiries were *ſpecialties*. I can ſcarce endure to hear Mr. *Sprat* tell us, that the *graver and more reſerved Ægyptians did confine their Philoſophy to their Temples*. There is a great noiſe made by ſome concerning the antient *Hieroglyphical* Learning of the *Ægyptians*; but I never heard that it was *confined* to their *prieſts* by the *graver Authority*; but rather that a company of *cheating lying Rogues* did make *fools* of the *people*, and by pretences of a *ſacred* and *myſterious Character* amuſed them: they had little of *Natural Philoſophy*; ſomewhat more of *Geometry* and *Aſtronomy*: all their *Knowledge* amounted not to much, as *Conringius* hath (*d*) demonſtrated; and after that the Suceſſors of *Alexander* had ſetled themſelves in *Ægypt*, that *foppery* decayed, & the grave *Ægyptians* at *Alexandria* endowed the profeſſors of *Phyſick* and ſundry *Philoſophies* there, (the place or Colledge was

pag. 170.

Pag. 7.

d Conringius de Medicin. Hermetica.

was called *Museum*, *Strabo lib.* 17.) and erected *Libraries*, and furnished the *Roman* Empire with *Physicians* to the days of *Valentinian*, and (e) *Domitian* with Books.

But it were *unpardonable* in a common *School-boy* to pass by the *Jonique* and *Italique Philosophers* un-mentioned; and to tell us, "*That in* Greece *the most considerable* (*and indeed the only successful*) *trials* "*were made at* Athens? Whereas, if we regard *Natural Philosophy*, and abstract from the Experiments of the *Aristotelians*, there was never any thing in *Athens* could compare with the discovery that *Thales*, *Anaximander*, *Anaximenes* and *Anaxagoras* made, which were of the *Jonique* Sect: and since the *Dialect* in which he *writ* (not the place of his Nativity) authorizeth me to do it, I shall reckon *Hippocrates* amongst the *Jonian* Philosophers, and Mr. *Sprat* may be certain *he* is not to be accounted for in *Athens*. And as to the *Italique* and *Eleatique* Sects, dare any man say *they*, that they were inferior to *Athens*, or that their trials were *un-successful*; who knows the performances of *Pythagoras*, *Empedocles*, *Acron*, *Parmenides*, *Melissus*, *Leucippus*, *Democritus*, *Ocellus*, *Lucanus*, *Archytas*, *Archimedes*, &c? At *Alexandria* (a place we may not improperly reckon in *Greece*, since not only Mr. *Sprat* omits the mention of those Professors as *Ægyptians*; but they writ in *Greek*, followed the *Grecian* (f) account and customes, not *Ægyptian*; and as *Athenæus* shews (*lib.* 4.) taught *Greece* it self Philosophy and the *Liberal Arts*) if we remember that it was the seat of (g) *Euclid* the *Mathematician*, and there is scarce one *Mathematician* recorded but was related to *Alexandria* as *Vossius* shews. "*Valde autem illud commendat Scholam ab* Euclide *erectam* Alexandriæ, *quod non solum multos reliquerit discipulos*; *de quo auctor* Pappus *in septimo collectionum* "*Mathematicarum*; *sed ab ejus tempore, usque ad tempora* Sarracenica,

e *Domitianum* —— misitque *Alexandriam* qui exemplaria describerent; emendarent. Ita discimus tempore *Domitiani* non caruisse Bibliotheca Alexandriam; nam semper *urbs illa* professores plurimos aluit. *Pagin. Gundiss.* de Philos. apud Roman. c. 168. p. 456.

pag. 7.

I believe the Cyrenaic Philosophers in the Court of Dionysius made very successful Experiments: and their number is paralleled by *Lypsius* (if my memory fail me not) in his *Stoical Manuduction*, to any that *Athens* ever saw.

f Conring. de Med. Hermet. c. 12. pag. 152.

f Euclides Mathematicus floruit temporibus Ptolomæi Lagidæ, eoque regnante primus Alexandriæ docuit *Matheſin*: ut ex *Proclo* diadocho videre est. *Voss.* de Phil. Sect. c. 11. Sect. 1.

" cenica *vix ullum invenire sit nobilem Mathematicum; quin* " *vel patria fuit* Alexandrinus; *vel saltem* Alexandriæ *de-* " *derit operam Mathesi.* Voss. de Scient. Mathemat. c. 15. pag. " 52. The same is avowed by Sir *Henry Savil* in his second " Lecture. " *Post* Euclidem *enituit* Archimedes —— & E- " ratosthenes. *Hos insecuti* Apollonius Pergæus, Geminus, " Theodosius, Menelaus *Geometra dictus, & alii ex Schola fere* " Alexandrinâ *profecti omnes, usque ad tempora* Sarracenorum. There flourished *Herophilus* and *Themison*, and *Dioscorides*, and many other Professors of *Physick*, *Anatomy*, and *Philosophy* (even *Chymistry*, and the *Philosophers-stone*) 'tis *extreme imprudence* to mention *Athens* thus! But, to gratifie him further than *he* deserves or can expect; to yield that up to *Aristotle* and his *Peripatetick* followers in *Athens* which cannot seem due to such as (*b*) spent their time *in idle talking and wandring under the fruitless shadows* of nature, in *their first institution*, (*as their successors have done ever since*) *and were utterly useless in respect of the good of man-kinde*. To grant our *Virtuoso* more than the *walks*, *porches*, and *gardens* he prates of, do merit, what a stranger is *he* in the *History of Philosophy*, and how ignorant of the *Subject he discourseth about*, not to know what *Dialects* the *Grecian* Philosophers *writ* in, nor how *elegant* was their *style*? Some used the *Jonique*, others the *Dorique* dialect, and those *embased* several ways according as *their humors*, their *Countreys*, or the *novelty of the Subject* put them upon it: And even at *Athens*, neither the *Stoiques*, nor *Epicureans* were so solicitous about *Rhetorick*, as to chuse that for *Philosophy* which they could most *eloquently* express. And since *Plato* had his λέξεις, and *Aristotle* his ἐντελέχεια and other *terms* and *expressions*, 'tis hard to think that they did so regulate their *Philosophy* by their regards to the *ornaments of speech*, as Mr. *Sprat* imagines. How comes it to pass then that our *Historian* intimates to us ('tis a " new *invention*! to give the *Co-* " *mical Wits* their due, though fooleries) that the *Athenians* " *were the* (i) *Masters of the Arts of speaking to all their Neigh-* " *bours* [which is false concerning the *Jonians*, and probably " of some others] *and so might well be inclined, rather to chuse such*

Mr. Sprat. pag. 327, 817.

i Did the *Athenians* teach *Hippocrates*, or *Democritus* to

"*such opinions of Nature, which they might* "*most elegantly expres, than such which* "*were more useful, but could not so well be* "*illustrated by the ornaments of Speech.*

Mr. *Sprat* further *informs* us, (and who can deny him to *glory* of being the first *discoverer* ?) that "*in the City of* Athens "*the knowledge of Nature had its Original* "*before either that of Discourse, or of hu-* "*mane Actions.*—— This is notoriously false; for it is manifest that *Anaxagoras Clazomenius* first brought from *Miletum* news of *Natural Philosophy* to *Athens*, teaching it to *Pericles* and *Euripides* : and before *that time* there were *Orators*, and Moral *Philosophers*, as certainly as ever there was a *Solon*, or (*l*) the *Sophists* at *Athens*.

I must profess here in the *Introduction* that 'tis *an hard thing to write against men that understand nothing* : and that it is not my present intention to manifest *all* those mistakes against *common reading* and *Literature*, which are in that *History*. I shall insist *now* but on *some*, but such as are so *gross* as to justifie the most harsh of *my censures*, and to gain a belief from my *Reader*, that those *who could not prevent these faylors* may be guilty of an infinite more. I appeal unto my *Reverend* and Learned School-Master Dr. *Busby* at *Westminster*, whether he, or any other Learned man, would have admitted of, much less have *applauded* such an *Exercise* as Mr. *Sprat* offers to his *Majesty* by way of *Dedication* ? Do a few *empty* though *smooth-placed words* make up *all Rhetorique* ? Is this *Nation* sunk *so low*, that *non-sense* and *ignorance* can be *voiced* for the most *Exemplary Eloquence* that late years have published ? *Oratio, si res non subest ab oratore percepta & cognita, aut nulla sit necesse est, aut omnium irrisione ludatur. Quid enim tam furiosum, quam verborum vel optimorum atque ornatissimorum sonitus inanis, nulla subjecta sententia aut scientia* ? The Epistle follows, and is *this*.

write ? did *these two* shew so great a care of *eloquent language* that they chose their *Philosophy* accordingly ? Or did not the one in the *Ionique*, the other in the *Dorique* phrase joyn many *words* and expressions thereby to describe their *Philosophical sentiments*. Read over, Oh ! *tres-haute & tres-agreable virtuos* Diogenes Laertius, & *Forsius* before you tell these Stories.

pag. 8.

k *Vossius de Phil. Sect. c. 1. Sect. 7.*

l Isocrat. in orat. περὶ ἀντιδόσεως.

Cicero de orator. l. 1.

THE

The Dedication of the History of the Royal Society unto his Majesty.

To the King.

SIR,

OF all the Kings of Europe, Your Majesty was the first, who confirmed this Noble Design of Experiments, by Your own Example, and by publick Establishment. An Enterprise equal to the most renown'd Actions of the best Princes. For, to encrease the Powers of all Mankind, and to free them from the Bondage of Errors, is greater Glory than to enlarge Empire, or to put Chains on the Necks of Conquer'd Nations.

What Reverence all Antiquity had for the Authors of Natural Discoveries, is Evident by the Diviner sort of Honor they conferr'd on them. Their Founders of Philosophical Opinions were only admir'd by their own Sects. Their Valiant Men and Generals did seldom rise higher than to Demy-Gods and Heroes. But the Gods they Worshipped with Temples and Altars, were those who instructed the world to Plow, to Sow, to Plant, to Spin, to build Houses, and to find out New Countries. This Zeal indeed, by which they express'd their Gratitude to such Benefactors, degenerated into Superstition: yet has it taught us, that an higher degree of Reputation is due to Discoverers, than to the Teachers of Speculative Doctrines, nay, even to Conquerors themselves.

Nor has the True God himself omitted to shew his value of Vulgar Arts. In the whole History of the First Monarchs of the world from Adam to Noah, there is no mention of their Wars, or their Victories: All that is recorded is this, they liv'd so many years, and taught their Posterity to keep Sheep, to till the Grounds, to plant Vineyards, to dwell in Tents, to build Cities, to play on the Harp and Organs, and to work in Brass and Iron. And if they deserved a Sacred Remembrance for one Natural or Mechanical Invention, Your Majesty will certainly obtain Immortal Fame, for having established a perpetual Succession of Inventors.

I am, &c.

THO. SPRAT.

Animadverſions upon the Epiſtle aforeſaid.

IT is a ſign that our *Virtuoſo* is little acquainted with the condition of *Europe*, and that the Intelligence of theſe *Curieuſe* is as bad or worſe than ever deceived the *Man of Stagyra*, in that he ſays, that *of all the Kings of* Europe *his Majeſty was the firſt, who confirmed this Noble deſign of Experiments by his own example.* —— Had not the Emperor *Rudolphus* a Colledge of *Chymiſts* to promote *Natural* and *uſeful Experiments* in *Phyſick* and *Philoſophy*, did he not oftentimes *work* himſelf in thoſe *Laboratories* where they had *Rulandus* and others for his aſſiſtents? take the teſtimony of one that was *preſent* with him. *Nec attinet ſuperiorum annorum Imperatores, Principes, & totam Nobilium familiam citare; cum manifeſtiſſimum ſit, multum ſtudii, laboris, diligentiæ atque ſumptuum in nobiliſſimam hanc artem* [Chemiæ] *collocaſſe Auguſtiſſimum noſtrum Cæſarem* Rudolphum *adducere licebit, quem publica fama paſſim conſtat, artem hanc Alchemiæ impenſe amare, artificiumque ſtudioſe de his exquirere, non raro ipſa* Chymica *aggredi, tractandaque nec dedignari.* —— Did not *Alphonſo* the laſt King of that name in *Naples* try many *Experiments* in his *Gardens*? and when he poorly abandoned his Countrey and Riches to the *French*, did he not (admire him, O ye *Comical Wits*!) did he not with ſeveral *choice Seeds* remember to ſhip ſome excellent *Bottles of Wine*, and ſo retired to *Sicily*? Did not King *Charles* the Firſt encourage and aſſiſt Dr. *Harvey* in the Diſquiſitions about the *Circulation of the Blood*, and *Generation of Animals*? Hath not there been at *Florence* an *Academy* for *Experiments in all manner of Philoſophy* promoted and kept on foot by the *Ducal Family*? Is there not, by the encouragement of the *Popes*, a *Laboratory* and Colledge of *Jeſuits* at *Rome*, whoſe great work

Mr. de *Silhon* in the ſecond part of his *Miniſter of State*, diſc. 7. obſerveth, but commends not the *Emperor Rudolphus*, in that he made a *Shop* and *Forge* of his Cabinet, and reduced all his *Imperial* thoughts into the ſearch of the Philoſophers-ſtone, and to make *Watches* and *Dyals*.

Martin. Ruland. in dedic. ad progymnaſm. *Alchemiæ.*

hath been for *many* years to enquire into all *natural Curiosities*? is it not there that *Schoinerus*, *Kirtherus*, *Ricciolus* and others have flourished before ever this *Royal Society* was thought upon? How long hath the Duke of *Holstein* kept up his *Laboratory* and *Chymical Colledge* at *Gottorp*? If all these be not *Crowned heads*; yet there are enough of *them* to take off from the generality *of the assertion* made by our *Virtuoso*; and the rest serve to extenuate the *complement*: But if I had gone about to reckon the *Cyrenaic* Academy under *Aristippus* at *Sicily*, and the Colledge of *Virtuosi* under *Petronius Arbiter* in *Rome*, as the establishments of *European* Princes; *Dionisius* and *Nero* had quite spoiled the flattery of this saying: yet any one that hath read *Plutarch*, *Suetonius*, or *Martial*, can tell the exploits of those *Mechanick* Philosophers, and how *they* depraved one of the best *Emperors* in the world.

Read the life of *Nero* in *Suetonius*, and reflect upon it.

As for the *publique Establishment of these experimental Philosophers*, I do grant that our *King* was the first that did such a *thing*: but the formality of a *Charter*, their *President* and *Mace*, and other such circumstances make more for their *Grandeur*, than the *King*'s *glory*, except that the usefulness of the design appear: the *ignorance* and *folly* of these *Comical Wits*, the *Members* of it hath more of *disgrace* in it, than there is *honour* in the *whole foundation*; it being more for his *prejudice* that it should be proclaimed abroad (as 'tis by this *Historian* and Mr. *Glanvills* writings) that our *Nation* are *a generation of illiterate fools and Coxcombs*, than 'tis for *his credit* that they have *inutile and insignificant desires after knowledge*.

"*An enterprise equal to the most renowned actions of the best Princes.* —— I have oftentimes reflected upon those *Actions* whereby Princes have acquired the *fame* of *great*, and *good*, but I never found any that gained either of those *Elogies*, by any *knick-knacks* of *Experimental* or *Mechanical Philosophy* alone: there have been some that making some of these inquiries of their *innocent divertisement*, & by doing all those actions which gain a repute of *political wisdom*, *courage*, *justice*, *piety*, *&c.* have transmitted an *honorable memory of themselves*; but these *tranghams* as they are contra-distinct to *sober* and *substantial*

vertue,

vertue, are ſo far from being *Actions equal to the moſt renowned enterpriſes* of the beſt *Princes*, that they do not expiate for other *their faults*: as any man may learn from the lives of thoſe *infortunate* Princes, *Dionyſius* and *Nero*. What writer advanceth the *repute* of *Alphonſo*, or juſtifies him for *murthering* and *oppreſſing* his *Subjects*, and loſing his *own*, whilſt he kept his *Garden*? Is *Diocletian* more famous for thoſe *ingenuities*, or infamous for his *perſecution of the Chriſtians*? I do not think that the *eſtabliſhment of this Society*, (had all things anſwered *mens wiſhes*, and out-done *their hopes*) would have been mentioned with ſo *much honour* as the moſt *renowned actions of the beſt Princes*: ſince the *actions* that relate to *goodneſs* and *piety* admit of *no compariſon*, (being of different *Natures* and *kinds*) but when a fool, (as here a *Virtuoſo*) holds the Scales. I ſhould not pardon my ſelf, ſhould I oppoſe the Heroicalneſs of this *enterpriſe*, with the actions of *Conſtantine* raiſing *Chriſtianity*; with thoſe of *Juſtinian* or *Theodoſius* in compiling their *Codes*: with the actions of our *Black Prince*, or *Henry* the *Fifth*: or with *Henry* the *Eighth* in *demoliſhing Abbies*, and rejecting the *Papal Authority*; or Queen *Elizabeths* exploits againſt *Spain*: or her reſtoring the *Proteſtant Religion*, putting the *Bible* into *Engliſh*, and ſupporting *the Proteſtants beyond Sea*: It is not for any man that pretends to be an *Ariſtotelian*, to make ſuch *compariſons*; much leſs to to infer as Mr. *Sprat* does. But the *reaſon* which he gives why the *eſtabliſhment of the Royal Society of Experimentators equalleth the moſt renowned actions of the beſt Princes*, is ſuch a pitiful one as *Guzman* de *Alfarache* never met with in the whole extent of the *Hoſpital of Fools*.

"*For*, to *increaſe the Powers of Mankinde*, *and to free them from the bondage* "*of Errors*, *is greater glory than to enlarge* "*Empire*, *or to put Chains on the necks of Conquered Nations*. —

These *Conſequences* are twiſted like the *cordage* of

Ocnus

I Would fain know whether the making of a Golden-Chain of 43 Links to the chain, the Lock and Key being faſtned and put about a fleas neck, ſhe drew the ſame, all which, Lock, Key, and Chain weighed but one grain and an half; as *Haw* relates in his Chronicles of Queen *Elizabeth*. *An. Regn.* 18. 1576. yet whether did his invention (ſurpaſſing all ever heard of the *R. S.*) render *Mark Scarlet* (the author) equal in *glory* or *renown* to his *Sovereign Princeſs* and her *beſt* or *moſt* famed *actions*; neither is it voyced as the moſt *important* atchievement of her *Reign*, though it were an *unuſual improvement of the Powers of Mankinde*, our Rebellious and vexatious *Fleas*.

Ocnus (the God of ſloth) in *Hell*, which are fit for nothing but *to fodder Aſſes with*. If our *Hiſtorian* mean by every *little invention* to *encreaſe the Powers of all Mankinde*, as an enterpriſe *of ſuch renown*; he is deceived: this *glory* is not due to ſuch as go about with *a dog and a hoop*; not to thoſe which keep *dancing Horſes and Bears*; not to the practiſers of *Leger-de-main*, or upon the *high* or *low rope*, not to every *Mountebank* and his man *Andrew*: all which with many other *Mechanical* and *Experimental Philoſophers*, do in *ſome ſort* encreaſe the *Powers of Mankinde*; and differ *no more* from ſome of the *Virtuoſi*, than a *Cat in a hole* doth from *a Cat out of an hole*; betwixt which that inquiſitive perſon *Asdryasduſt Toſſoffacan*, found a very great reſemblance. Neither is it worth the while to go about to diſ-abuſe Man-kinde about *every little error*: to rectifie every *vulgar miſtake* about *natural Phænomena*, this is an enterpriſe *God* never delegated any man unto; *Moſes* who was faithful in all his *Reiglement* omitted the *contrivance* of our illuſtrious *Society*: Chriſt and his *Apoſtles* mentioned it not; but were content by their Language to countenance thoſe *Vulgar Locutions*, the Refutation whereof is now ſo *Renowned* and *Important*. It is the Utility of *Inventions* that acquires a *Value* to them. 'Tis not the encreaſing of the *Powers of Man-kind* by the *project of a Diving-bell*, which our Nation holds Equivalent *to the ending of a War, at the firſt Battle*. 'Tis not a *Pendulum Wateh*, nor *Spectacles wherely divers may ſee under water*, nor the new *Ingenuity* of *Apple-Roaſters*, nor every *Petty diſcovery* or Inſtrument of Ingenious Luxury muſt be put in compariſon, much leſs be preferred before the *Protection*, and *Enlargement of Empires*.

"That all *Antiquity had ſuch a Reverence for the Authors* "*of Natural diſcoveries, as to beſtow a Diviner ſort of Honour* "*upon them, that the* Gods *were Worſhipped with* Temples *and* "Altars, *were thoſe that inſtructed the World to* Plow, *to* Sowe, "*to* Plant, *to* Spin, *to* build Houſes, *and to find out* New Coun-"tries. ——— This is a tale hath ſo much of Ignorance in it, that I believe no School-boy ever uttered the like. The Task is *difficult*, if not *impoſſible* to ſtate the ſeveral diſtinctions

of

of the *Paynim Gods*, and to *adjust* unto them *their Honors*, according as they are distinguished into *Dii Longentes* or *Majorum Gentium*: and the *Semi-Dei* and *Heroes* and the *Semones*. It is true that amongst the *principal Gods* these are recounted,

The *Dii Majorum Gentium*, or those whom *Tully* reckons upon as having gained a worship generally before the world was aware, and he opposeth them to such as by their *merits* gained adoration: so that they were not worshipped as Inventors.

Juno, Vesta, Minerva, Ceres, Diana, Venus, Mercurius, Jovis, Neptunus, Vulcanus, Apollo.

and although it be *true* that most of these were *Autors of Natural discoveries*, yet it is *first* observable how *all Antiquity* had such a *Reverence* for them that were eminent for *Moral vertue*, *civil Prudence*, and those *Qualifications* that inable a *Prince* to *Govern well*, that they made *Jupiter* to be the chief of all the *Gods*, and the most *powerful* of *them all*, whose *Fame* lay in the *Arts of Government*, in his Governing his Subjects in *Crete* with due admiration of *Justice*, in preserving his *Land* and *Naval-Forces*, in advancing of *Commerce* and all *those Sciences* that are useful in a *Society*. They made *Jove* the Father of *Pallas*, and *Mercury* the Deities of *Artisans* and *Mechanical Philosophers*. It is false that the *Gods they worshipped with Temples and Altars, were those that instructed the world to plow, to sowe*, &c. For it is evident that all *these Honors* were conferred on such as were not *Inventors*, so that he makes an *Antithesis* where there is *none*. For the *deified Emperors*, the *Heroes* and *Semi-Dei* shared all these *Honors* with the greatest *Gods*; and some of them in as *eminent* a manner as most of the others; which any man knows that understands what veneration *Hercules* was in, and what *Tenths* were vowed to *him*, and what *Priests* he had. Every Writer almost tells us of *Temples* or *Fanes*, called ἕδρα erected for the Honor and the Worship of the *Heroes*; also of their σκιαὶ, & ἀγάλματα of their *Sacrifices* and Festivals, ἐς ἑορτὰς ἐλθόντες καὶ τιμὰς ἀποδόντες ἀγῶνας καὶ θυσίας. He was not deified for his *Natural Philosophy*, of whom *Virgil* faith,

If you read the Dedications of Altars to *Augustus*, and other *Heroes*, you will see the *Laws* of them were the same with those of *Diana* in mount *Aventine*. See *Rosinus* Antiquit. l. 2.

Thucid. l. 5. vid. *Hen. Steph.* in vocibus σκιὰς, ἄγαλμα, ἀγῶν.

Nempe

Eclog. 1. *Nempe erit ille mihi semper* Deus; *illius aram*
Sæpe tener nostris ab ovilibus imbuet Agnus.

It was the same person to whom *Horace* relates:

Viventi tibi maturos largimur honores,
Jurandasque tuum per nomen ponimus aras.

It was not for *such curiosities* that *Julius Cæsar* had his place amongst the *Gods*, and how he was worshipped learn from *Maro* thus:

Eclog. 5. *Ipsa sonant arbusta,* Deus, Deus, ille, *Menalca.*
Sis bonus ô felixque tuis. En quatuor aras,
Ecce duas *tibi,* Daphni, *duoque altaria* Phœbo:
Pocula bina novo spumantia lacte quotannis,
Crateraque duo statuam tibi pinguis olivi.

Hæc tibi *semper erunt, & cum solennia vota*
Reddemus Nymphis, & cum lustrabimus agros.

Ut Baccho, Cererique, *tibi sic vota quotannis*
Agricolæ facient? damnabis tu quoque votis.

It is manifest then to any man of *common reading*, that the *Gods*, the Antients *worshipped with Temples and Altars*, were not only those that did *teach them to plant*, &c. And it is observable, that such as were deified *upon any such account* gained *such Honors* in the most ignorant times and Nations: the more *prudent generations*, which deified the *vertuous*, the *wise*, the *valiant*, conferred no *such respects* upon every *trivial Inventor of Mechanisms*. Even *Rome* did so contrive the *Temples* of *Vertue* and *Honor*, that there was no *ingress* for a *Virtuoso* there: no coming at the Temple of *Honor* but through that of *Virtue*. And *Tully* when he recites those merits which advanced men to Heaven, he names them thus. *Ast olla, præter quæ datur adscensus in cœlum mentem, virtutem, pietatem, fidem, earumque laudum delubra sunto.* Even when the *deifying* humor possessed *ignorant* Mortals, I can frame no other judgment of things, than that there was much of *chance* in their advancement: for oftentimes the *greatest Inventions* did not gain one those *Honors* which

Rosin. Antiq. Rom. l. 2. c. 19.
Cicero de leg. l. 2.

which were payed to *inferior discoveries*. I do not finde that *Tiphys* who first built a Ship, or *Triptolemus*, who was *unci monstrator* or *atri*, had the honors of *Demy-Gods*: not that *Perdix* who invented a *Saw* was *deified*, but when his Master cast him head-long from *Minervas* Tower in *Athens*, they feined that he was turned into a *Patridge*, not a *God*: so that for ought I can perceive by this *Story*, had any man found out an *Ambling-Saddle*, he might have been thought converted into an *Owl*, in stead of being worshipped with *Temples* and *Altars*. Neither was *Dædalus* so deified for his ingenious way of *pimping* for *Pasiphae*; nor *Perillus* for the *Mechanical contrivance* of the of the *Bull* of *Phalaris* the *Tyrant*. In fine, from the days that *Sparta* flourished to the Empire of the *Mancha* under the ingenious Author of the *Experimental* History of *Don Quixote*, I do not find that the *little inventors* of *trivial* and *useless toys*, though *improvements of reall knowledge*, and of the *powers of all mankind*, have had that honor which Mr. *Sprat* intimates. I shall recommend unto my *Reader* the description of a most accomplished *Virtuoso* in *Maximus Tyrius*, his name was *Mithecus*, one not famous for *ancient Learning*, no *Orator*, *Sophister*, or *notional Philosopher*, but a man that was for the improvement of *useful knowledge in Cookery*, viz. *Hujus Sophistæ studium eo tendebat ut conficeret opsi quod, quod voluptatem haberet una cum utilitate ipsa temperatum. Quippe qui concinnandis dapibus ita operam daret, ut escas acceptas ratione condimentorum temperamento, varietateque, atque ignis ministerio vescentibus jucunditatem præberet meliores multo quam pro natura propria efficeret.* None can deny this person the repute of an eminent *Virtuoso*, an *improver of the powers of man*, and a *discoverer of vulgar Errors*, (I know a Member of the *Royal Society* who hath *nothing in him* but the skill to dress a *Carp* well) this man was admired by all *Greece* almost, but not *deified*: he met with no *Temples*, nor *Altars*, but coming to *Sparta*, be offered to reclaim them from their *Black Broth*, and wretched *Cookery*, and to instruct them in

These discoveries are greater than what our Royal Society have produced: so that they might have missed of *Temples* and *Altars* notwithstanding that they contrived the *royal Catherines's* first Model, and built the *double keel'd* Experiment; which how she carried her self upon a *tasque*, how she would *bear up against the wind*, how she would live in a great Sea, their Historian tells not, but puts us off with a *fib*.

Sermon 8.

Maximus Tyrius Serm. 8. citante Jacob. Mazonio de comp. Arist. & Platon. Sect. 7. pag. 256.

these

thoſe diſhes which might be called (in the phraſe of our *Hiſtorian*) the *uſeful Arts of life*. But the Magiſtrates of *Lacedæmon* did ſummon *Mithecus* before them, *and baniſhed him immediately out of their Territories*. I find in *Michael Cerrantes* in the *Preface* to the ſecond part of the *Manchegal Experiments*, a narration concerning an *ingenious* perſon in *Spain*, who was eſteemed as *mad* by his Neighbours, though he did thoſe feats that that might have rendred him conſiderable to ſome of the *Society*, and gained him an *immortal fame* in *Philoſophical* tranſactions. The paſſage runs thus: "There was a Mad-man in *Sevil* "which hit upon one of the prettieſt abſurd tricks that ever "Mad-man in the world lighted on; which was: he made "him a Cane ſharp at one end, and then catching a Dog in "the Street or elſewhere, he held faſt one of the Dogs legs "under his Foot, and the other he held up with his hand. "Then fitting his Cane as well as he could behind, he fell a "blowing till he made the Dog as round as a Ball: and then "holding him ſtill in the ſame manner, he gave him two claps "with his hand on his Belly, and ſo let him go, ſaying to thoſe "that ſtood by (which always were many) how think you "my Maſters? Is it a ſmall matter to blow up a Dog like a Bladder? However in this the moſt *Dull Members* of the *Society* are *redevable* to their *Hiſtorian*. He hath ſhewed that the *Ancient Paynims* did worſhip ſuch *Blocks* as ſome are *now*; and that *thoſe* heretofore would have paſſed for *Heathen Gods*, whom all ſober and Serious *Proteſtants* look upon as Heathens. Their *Founders of* Philoſophical *Opinions*, he ſays were *only admired by their own Sects*. But although Mr. *Sprat* ſay it, I am aſſured that *Plato*, *Pythagoras* and *Anacharſis* were admired by more than ever *ſaw* them, or were their *particular Scholars*, and *followers*. That *Ariſtotle* might admire his *Maſter*, and *Pythagoras*, and *Democritus*, and *Socrates*; that a *Stoique* might pay very great reſpect to *Epicurus*, is as credible, as that *Tully* ſhould eſteem the Friendſhip of *Atticus*; or *Brutus* revere *Caſſius*; or *Seneca* expatiate in commendation of the Tutor of *Metrodorus*: or that the *Seven Wiſe men* ſhould ſo admire the wiſdom of *one another*, as to tranſmit the Golden *Tripos* from themſelves

Mr. Sprat. p. 119

Preface to the ſecond part of the Hiſtory of Don Quixote.

and

and followers, each to the other. But that those *Antients* he so much talks of, did confer *those Diviner sort of Honors* upon the *Founders of Philosophical Opinions* and built some of them *Temples* and *Altars*, Mr. *Sprat* might have learned from *Tertullian*, who says, *Plerosque Autores etiam Deos existimavit Antiquitas, nedum Divos, ut Mercurium Ægyptium cui præcipue* Plato *adsuevit*: *ut* Silenum Phrygium *cui a pastoribus perducto ingentes aures suas* Midas *tradidit*, *ut* Hermotimum, *cui* Clazomenii *mortuo Templum contulerunt*; *ut* Orpheum, *ut* Musæum, *ut* Pherecyden Pythagoræ *Magistrum*. But it is too much to expect that our *Virtuoso* and *Divine* should have read *Tertullian*. These are not times wherein men have will or leisure to look into those *Antiquated Studies*; to be *Wits and agreeable company*, to be *Poets*, to see, and *understand* and *write Plays*; to talk of and pretend to certain *Toyish Experiments*; these are *Cares* of such *high concernment*, that all *Philology* is but *Pedantry*; and *Polemical Divinity*, Controversies with which we are *Satiated*. Howsoever one would have thought the ordinary stock of School-learning might have instructed Mr. *Sprat* in the *Mythology* of the *Ancients*, better than to have ignored *these things*. He might there have learned that the *Thracians*, and particularly the *Getes* (the most *Just*, and most *Valiant* Nation amongst them) did deifie and *offer Sacrifice*, and pay all those *Honors*, which were held to be most *Divine* unto *Zamolxis*, who, whether the *Servant*, or *Predecessor* of *Pythagoras*, it matters not, since *Herodotus*, *Strabo*, *Laertius*, and the Author of the *Etymologicon*, all agree that he was reputed and worshipped for a God ὃ παρὰ τοῖς Γέταις Θεός. So saith *Strabo* of him: ᾧ καὶ Γέται θύουσι, saith *Laertius*; He was the Founder of *Philosophical Opinions*, if *Pythagoras* was a *follower of his*; and if *Pythagoras* taught *him*; he was the *Promulgator* of Philosophical Opinions in *Thrace*, and having taught them the Immortality, and Transmigration of Souls, *and instructed them in their ways of worshiping God*, without any mention of his *Experimental Philosophy*, it is averred that he gained the esteem and worship of a *God*. That *Hercules* was a *Philosopher* and disciple of *Atlas* who instructed him in the Doctrine of the *Spheres*, and *Astronomy*, is as confi-

De Anc. c. 1.

Vid. Diogen. Laert. lib. 8. cum Notis Casauboni, Aldobrandini, & Menagii.

dently avowed, as it is *He* was *Deified*. So *Schrevelius*. *Constat enim* Herculem *Philosophum fuisse. Et ratio est, cur omnia illa monstra vicisse dicatur.* It is manifest that *Hercules* was a *Philosopher*; and for that reason he is said to have overcome so many Monsters (which were but *Monstrous Opinions*) and it is as notorious that for the subduing of *those Monsters*, he was reckoned a *God*, honoured with *Tithes*, *Temples*, *Priests*, and *Sacrifices*; That *Plato* derived all his repute from the *Inventive* and *Experimental Philosophy*, is a thing I yet understand not, but that there wanted not such as reckon him amongst the *Demy-Gods*, in a time when men had given over the *Deifying* of *Ratcatchers*, is certain. *Hunc* Platonem Labeo *inter Semi-deos Commemorandum putavit: Semi-deos autem Heroibus anteponit, & utrosque inter Numina collocat. Verumtamen istum quem Semideum appellat, non Heroibus tantum, sed etiam Diis ipsis præferendum esse, non dubito*, so saith *August. de civit. Dei. l.* 2. *c.* 14. And *that man of Stagyra*, that Idol of Disputers is termed an *Heroe* by *Jul. Scaliger*, a man of as *inquisitive* and *Experimental* a Spirit, as any of this *age* or *Mechanical Society* ever produced. Read his Character, and despair of the *like* that it will ever be given to any of the *Virtuosi*, viz. *de subtil. exercit.* 194. *Sect.* 4. *Barbara ingenia levissimis momentis impelluntur ad Divini atque incomparabilis Herois Obtrectationem. Duæ namque sunt Aquilæ solæ, in natura rerum: altera bellicæ laudis, altera literariæ; Illa potentiæ, hæc Sapientiæ*: Cæsar & Aristoteles. I am ashamed to be put upon the Proof of *those things*, which their Country School-Masters should have taught *them*, and so should have prevented me this *trouble*, which I find not yet to be at an end.

Vid. Schevelium in Virgin. Aeneid. l. 1. *v. fc.* 745.

"Their *Valiant men* and *Generals*, did seldome rise higher "than to *Demy-Gods* and *Heroes*. But the *Gods* they *Worshipped* "with *Temples* and *Altars*, were those who instructed the "world to Plowe, *&c.* —— By this *Antithesis* any one will conjecture that the *Heroes* and *Demi-gods* had no *Temples* and *Altars*, which is a childish and unpardonable *Error*, as any Boy conversant in the *Roman Antiquities* will tell him, and I have shewed before: Evander *propter summam Sapientiam & Eruditi-*

traditionem, pro Deo cultus est ab Aboriginibus: imo Romani Divinos ei honores tribuentes aram condiderunt, & quotannis Sacrificia obtulerunt, sicut & alii, Heroibus iisdem fecerunt, ut testatur Dionysius Halicarnassæus, lib. Primo, *Ara Evandri erat in colle* Aventino. No man ever took *Hercules* or *Zamolxis*, or *Castor* and *Pollux* and *Quirinus*, or those Roman Emperors that were Deified, as *Julius Cæsar*, *Augustus*, and others for more than *Demy-Gods* and *Heroes*, yet had they *Temples* and *Altars*, Priests *and Sacrifices*, as every School-boy knows. Let any man enquire into the Ethnick *Theology*, and see if the Authors *of Natural Discoveries* either exceed in *number* or *dignity* the *Heroes* and *Demi-Gods* who gained an *Apotheosis* by their *worth*, by being *Legislators*, *Generals*, or *Kings* and *Emperors*: If they do not, (as 'tis certain *they* do not) what *truth* is there in what Mr. *Sprat* tells his Majesty, that *a diviner sort of honor was conferred on them, than on the founders of* Philosophical *Opinions*? And how far will they be to *seek*, that go to search Antiquity for proofs *that* an *higher degree of Reputation is due to* Discoverers, *than to the* Teachers *of* Speculative Doctrines, *nay even to* Conquerors *themselves*?

Arnob. adv. Anquit. Rom. l. 2. c. 17. de diis Indigetibus.

"*Nor hath the true God himself omitted to shew his value of* "Vulgar *Arts*; *In the whole History of the first Monarchs of the* "*World from* Adam *to* Noah, *there is no mention of their* Wars, "*or their* Victories. *All that is Recorded is this, they lived so ma-* "*ny years, and taught their* Posterity *to keep* Sheep, *to till the* "Ground, *to plant* Vineyards, *to dwell in* Tents, *to build* Cities, *to* "*play on the* Harp *and* Organs, *& to work in* Brass *&* Iron, &c. I have already demonstrated the Ignorance of Mr. *Sprat* in *Philology* and humane Learning. Here he discovers himself to be as little acquainted with the *Bible*; and seems to have as little of *Divinity*, as other *Scholar-ship* in him. It is more than the *Text* warrants him, to say, That God Almighty mentioned those *Discoveries* out of his *Value of those Vulgar Arts*. Who made him Privy to the *Secret Counsels of Heaven*? or who impowred him to add to the *Scripture*? Doth he not fear lest *God* should add *unto him the plagues that are* written in that Book? Revel. 22. 18. It was good advice which *Agur* giveth, *Add not to his words*, Prov. 30. 6.

lest

leſt he reprove thee, and thou beeſt found a Lyar. Any man elſe who had conſidered how *the thoughts of God are not as our thoughts*; or have imagined that God took notice of thoſe *Vulgar Arts*, out of a *Value he plated on them*, wheras he no where ſhews ſuch an eſteem for *them*, nor takes notice of more important diſcoveries, which happened within the compaſs of *Moſes's writing*, and might have *merited* his regard, as *well* as theſe. He takes no notice who firſt diſcovered *Minerals*; whoſe Inventions were *Gold* and *Silver*, and *precious ſtones*; whoſe project it was to make *Linnen*, and *Silks*, and the like. If theſe *Vulgar Arts* deſerved his ſacred Remembrance, as they were *Arts*, it is certain then that all *Arts* deſerved his Remembrance, and he would have been *Juſt unto them*. I ſuppoſe him to have forgot his *Logick*, and therefore needs to have that old rule ſuggeſted to him, *A quatenus ad De omni valet conſequentia*. But let us leave this *Secret* unto him *to whom it appertains*.

Such is the pulveriſing of Gold, when *Moſes* burnt the Golden *Calf* to powder; A thing not to be performed in theſe days, without the help of Chymiſtry.

I deſire to know by what right he calls thoſe *Inventors* of the ſaid *Vulgar Arts*, by the Title of *Monarchs*? Surely they were not *ſuch*: for neither *paternal* right, nor *Primo-geniture* (if they create any *Sovereignty*, as I am confident they do not) could intervene *here* ſo as to juſtifie *him*: for *Adam* lived to ſee *Lamech*, which was the *ninth Generation*; where then could be their *Monarchy*? or, who were their *Subjects*? Can any man imagine that *Abel* was ever a *Monarch*? or that *Cain*, at the time when he *tilled the Ground* (as his Brother kept *Sheep*) was capable of ſuch a *Title*? or, that *Jubal*, *Jubal* and *Tubal-Cain* were Monarchs during the life of old *Lamech* their Father? this is not amongſt the *things Recorded of them*. —— "For there is *no more ſaid of them* (if we believe "Mr. *Sprats* great Reading) *than that they lived ſo many years, and taught their poſterity to keep ſheep*, &c. But is this all that is recorded of them? Dare you avow the ſaying *in verbo Sacerdotis*? Is the Hiſtory of the *Creation*, of *Paradiſe*, the *fall of man*, *the puniſhments of his ſin*, the *promiſe of a Meſſiah*, the *acceptableneſs of Piety*, *the odiouſneſs of impiety*, *ſpecified in the accounts of* Cain *and* Abel, together *with the examples of* God's *Vengeance purſuing ſinners in this life*, *and the terrors of a guilty Conſcience*;

Conſcience; Is the Hiſtory of *Enoch's walking with* God, *and his Tranſlation*; *the Relation of the wickedneſs of the World*, *and of the Deluge enſuing thereupon*; the *ſevere prohibition of Murder*; the *preſervation of* Noah; the *Sacrifice he offered at his coming forth*; God's *promiſe thereupon*; His *Covenant with* Noah: Are all theſe *inſignificant* paſſages *not worth the regard*, not ſo *conſiderable* as that *Noah* (ſubſequent to all theſe) planted a *Vineyard*? whereas he ſaith, there is *no mention of their Wars or their Victories*; How can he reconcile this with the Battle of thoſe two mighty *Monarchs Cain* and *Abel*, in the which the *one* was ſlain, the other remained *Victorious*? Did not that *puiſſant* Prince *Lamech* kill a man to his wounding? But, above all, who could have imagined that a *Virtuoſo* of *this age* ſhould not have taken *ſpecial* notice of that part of the *all* which is recorded of thoſe *Monarchs*, that relates to *Lamech* his having *two wives*? and that the reſt *begat Sons and Daughters moſt of* them? As to the Diſcoverers of thoſe uſeful Arts recorded in *Scripture*; it is uſually obſerved by *Divines* upon the *place*, that the *greateſt Inventors*, and the moſt ingenious at *Experimental Philoſophy*, were the brood of *Cain*; and to pretend with ſo much ado to be the imitators of that *wicked progeny*, puts me in mind of a ſort of Heretiques in *Epiphanius*, who derived their pedigree from *Cain*, and claimed Kin with *Core*, *Dathan*, and *Abiram*. Thus the *Teufels* a Family in *Almain*, are ſaid to give as the Arms of their Houſe, a *Divel Gules*, *in a Field Or*. The concluſion of that Chapter in which *God* is pleaſed to Record thoſe *authors of Natural* Diſcoveries, is very remarkable, intimating as if the riſe of *Experimental Philoſophy*, were the *Ruine* of *Piety*, and that whiles men were ſo buſie about *Earthly concerns* they had forgot to *Worſhip God*. *Then began men to call upon the Name of the Lord*. Which words admit of various Expoſitions, but ſuch as *all* carry a reflexion upon the *Inventors*. Some read it to this purpoſe; *Then profaneneſs began in calling on the Name of Jehovah*. With which accords the *Chaldee* Paraphraſe, *Then the Sons of man left off praying* (or, became profane, ſo that they prayed not) in the Name of the *Lord*. Others Expound it thus; that

Gen. 4. 26.

See Anſwers upon the place.

when

when the Holy Seed *Enoch*, *Mathuselah*, *Noah*, &c. saw impiety to encrease, and that *men* laid aside all *fear* and worship of *God*, to prosecute *Inventions delightful* and *profitable*, they began to be troubled, and to *call upon God* in *a peculiar manner*, and to preach *Repentance*. A third party thus senseth it, that when the Sons of *Cain* busied themselves in the *discoveries of Nature*, and the *divertisements of Luxury*, and were called perhaps, the *ingenious*, and the *Curieuse*, the *Saints* and Holy race did not seek to be denominated from their *Carvings* or their *Musique*; but the *fear of the Lord*, which is the *beginning* of all solid *Wisdom*: and by their *calling upon the Name of Jehovah* were contra distinguished from those *Experimentators*. Had I been as Mr. *Sprat*, I would have declined this part of the *Rhetorical Address*, by reason of this *severe reflexion*, which he must needs see was obvious to every Adversary.

" And if they deserved a *Sacred Remembrance* for one *Na-*
" *tural* or *Mechanical Invention*, your *Majesty* will certainly
" obtain *Immortal Fame* for having Established a perpetual Suc-
" cession of *Inventors*. —— In the first place Mr. *Sprat*, I am to seek, How these persons could by their Inventions *deserve* at the hands of *God*? What *Doctrine of Merit* is this you would introduce? Is not the *Plowing* of the *wicked*, Sin? Are not the *best of men* to ask pardon for the defaults that attend their best *actions*? Is it not true, *Deus coronat in nobis sua opera*? What have we *that we have not received*? Where then is any *desert* or *boasting*? In the *Antapodosis* of this Period, I expected an inference, that *God Almighty* would have sent some new *Prophet* or Holy Penman to Record the *Natural* and *Mechanical Inventions of this Age*, to perpetuate their *Glory*, and the *Establishing of the Succession of Inventors*: But he promiseth no such thing: only he assures the King of *Immortal Fame* for Establishing this *Society of Inventors*: whether they invent any thing *material* or *no*.

When I consider the *Falshood* of their *Natural Relations*, the many untruths which *He* and Mr. *Glanvil*, and other *Virtuosi* obtrude upon us, as to the *Antient Writers* and their *Ignorance*; and as to *Modern Writers* and their *Discoveries*; I fear the

the Fame his Majeſty will acquire hereafter will be, that *He* (out of his *ſincere* and *Generous Intentions* to advance the *Knowledge* and *Honour* and *Welfare* of his people) Eſtabliſhed a *Society* of *ſuch Experimental Philoſophers* and *Inventors* (I believe and hope it will not laſt to a Succeſſion) that *he* will become for ever an *Inſtance* and *Example* how much the Goodneſs and *Ingennity* of a Prince may be abuſed, and the moſt ſpecious pretences accommodated to *mean deſigns*. But what *Poſterity* will think of us, how much their eſtimate for theſe *Studies* may vary, I know not. I know that a few years have changed Extremely the *Sentiments* of *this Age*, & the *Opinion* of *Honorable*, *Judicious*, and *Sober* perſons (ſuch as are and were Members of the *Royal Society*) is very different now from what it hath been: and that Antient Poet *Virgil* hath more abettors than *Pindarical* Mr. *Sprat*, ſince he prefers thoſe ſtudies which inſtruct *men* in the *Arts of Government*, that is, that *Learning which our Univerſities intend*, before the *Mechanical Education* of the *Virtuoſi*.

Excudent alii ſpirantia mollius æra,
Credo equidem, vivos ducent de marmore vultus,
Orabunt cauſas melius, cœlique meatus
Deſcribent radio, & ſurgentia ſydera dicent.
Tu *regere imperio populos*, Romane, *memento*;
(Hæ tibi erunt artes) *paciſque imponere morem,*
Parcere ſubjectis & debellare ſuperbos.

Virg. Æneid. lib. 6.

Others, I grant, ſhall mould reſpiring Braſs,
And grave on Marble a more lively Face;
Some better plead; and ſome Aſtronomers
Better deſcribe Heavens motion, and the Stars:
Be thou ambitious how to Govern beſt,
In theſe Arts *Roman*, thou muſt be profeſt,

Mr. Ogleby's Tranſlation.

That we a Peace well-grounded may enjoy,
Subjects to ſpare, and Rebels to deſtroy.

"While the *Biſhops* of *Rome*, did aſſume an *Infallibili-*
"*ty*, and a Sovereign Dominion over our Faith: the *Re-*
"*formed Churches* did not only juſtly refuſe to grant them
"*that*, but *ſome of them* thought themſelves obliged to
"forbear all Communion with *them*, and would not give
"them that reſpect which poſſibly might belong unto ſo
"*Antient* and ſo *Famous* a Church: and which might ſtill
"have been allowed it, without any danger of *Super-*
"*ſtition*. —— Having repreſented to the World how little Mr. *Sprat* is verſed in *Grammar-Learning*, and the *Bible*: Here he gives me an occaſion to ſhew his Ignorance in *Church-Hiſtory*. It is *falſe* and notoriouſly known to be ſo, by any man that is converſant in the Writings of our *Divines* againſt the *Papiſts*, that the Grand *Motive* and Reaſon why the *Reformed Churches* did Separate from the *Biſhops* of *Rome*, was becauſe they *aſſumed an Infallibility and Sovereign Dominion over our Faith*. Had the *Popes* taught the *ſincere* Truths of the Goſpel, had they not depraved them with heatheniſh and *Superſtitious Follies*, *Blaſphemies*, and *Idolatry*, the Point of *Infallibility* had never come into Queſtion amongſt thoſe who were in poſſeſſion of *Truth* and *Peace*: but when the groſs *Uſurpations*, *Errors*, and *Damnable Blaſphemies* and *Idolatries* of the *See* of *Rome* came into *Diſpute*, and to be refuted by the means of that *Critical Learning* and *Philoſophy* (aſſiſted by the peculiar Grace and concurrence of *God*) which our *Virtuoſi* deny; then was this Queſtion ſtarted about the Infallibility of the *Roman Catholick Church*, whether *that* could Erre? That the *Biſhops* of *Rome* either are Infallible, or have *any Sovereign Dominion over our Faith*, was no Queſtion on which *Proteſtancy*

testancy was introduced and *Communion* with *Papists* refused. The *Papists* themselves did avow it: they held that the *Church Catholick* could not Erre, and that *they*, that is the *Christians* in *Communion with them* were the *Church Catholick*. If the *Popes* Infallibility came to be asserted, it was by the Canonists (impious and indeed Blasphemous Parasites) *Sic omnes Apostolicæ sedis Sanctiones accipiendæ sunt, tanquam ipsius Divini Petri voce firmatæ sint.* So saies *Gratian. Distinct: 19. Canon: 3.* But the General Counsels of *Pisa*, *Constance* and *Basil* have sufficiently damn'd this Doctrine. *Leo* the Tenth in the *Lateran* Counsel said indeed, that none of his Predecessors *had erred* (but he evidently erred in saying so) yet he neither did nor durst say *they were infallible*. The Jesuites of late do (I confess) assert the Popes infallibility, but I well know the *Sorbon* and the (a) *Parliament* of *Paris*, and the (b) *French King* too have lately damn'd this Doctrine (of the *Popes* sworn Janizaries.) Nay so ridiculous is this assertion of theirs, that they neither tell us, nor know themselves, how he is infallible: whether by himself, or with his Consistory of Cardinals or a General Counsel? and then, what is a true General Counsel? who must call it? who have decisive Votes? and whether all or the Major part may be enough to make a Canon? Concerning these (and many such Questions more) they are not agreed, and so cannot assure us of what they are not assured themselves. If any *Pope* ever did assume a *personal infallibility and Soveraignty in matters of Faith*, any man might have rejected the bold *Assertor* without being an *Heretick*, or being guilty of *Apostasy* from the *Roman-Catholick Church*, for the *Gallican Church* keep Communion, and yet ever denyed the *Popes* infallibility. In fine, the Point of *Infallibility* of the *Roman Catholick Church* (I am not such a Fool as to say the Infallibility of the Bishops of *Rome*, for they are confessed to have *Erred* and that *damnably* some times) was not the *occasion* of the rupture betwixt the *Papists* and the *Protestants* at first; nor doth it now continue it otherwise then by *accident*, in as much as it hinders the *Reformation* of those

(a) *Arrest de la Cour de Parliament portant que les propositions contenuës en la Declaration de la Faculte de Theologie de Paris. &c. Da. 30. May. 1663.*

(b) *Declaration du Roy pour l'Enregistrement des six propositions de la Faculté de Sorbonne, &c. A Paris. 4.. d'Aoust 1663.*

Idolatrous Tenets and practiſes with which that *man of Sin* hath filled *his adherents*, and without the profeſſion whereof no *Proteſtant* can be admitted to their *Church-memberſhip* and *Communion*. Let any man but comply with them in theſe *Solemnities*, and I dare engage that he ſhall never be preſſed *Authoritatively* to own that *perſonal Infallibility* of the *Pope* or his *Soveraign Dominion in matters of Faith*: So that there muſt be more *Important grounds* than Mr. *Sprat* imtimates for that great Action of the *Reformed Churches*; or the imputation of *Malepertneſs* and horrid *Schiſme* muſt be fixed on them: But the Truth is, *they* were *infallibly* certain *Certitudine fidei*, as aſſured as they were of the Truth of the *Bible*, and *Gods word*; and as *Morally* certain as *Metaphyſicks*, natural (That is *Ariſtotelian*) Phyloſophy, and *Skill of Tongues* could make them, that the *Papiſts* did hold ſuch *Errors*, as none could *know*, and *Communicate* with, without hazard of damnation; Nor any *Ignorantly* profeſs and be *ſaved*, without the benefit of an hearty though *General* repentance, and the *boundleſs* (but not to be preſumed upon) *Effects* of that mercy of *God* in *Chriſt*, which the *Antichriſtaniſme* of that *Satanicall Synagogue* otherwiſe would fruſtrate. Tis nôt diſputed betwixt *Church* and *Church* whether the *Pope* can *add* new Articles of *Faith*, or vary the *old Creed*: the current of *Popiſh* writers aſcribe unto him no ſuch *Dominion over our Faith*, no nor to their Counſels. They are to enquire *Quid traditum eſt?* What there is of Eccleſiaſticall *Tradition* in the Scripture and the *Church Doctrine and Practiſe*, and to determine *this* or *that* to be *de fide*, becauſe it hath alwaies been *de fide*: Every *Point* that comes ſhort of this *declaration*, is ſo farr ſhort of its *Catholiciſme*, and the *Obligation to believe it*. And now let any man Judge whether Mr. *Sprat* were of the number of thoſe that were *Satiated* (to uſe his own expreſſion pag. 152) *with Religious diſputes*, or of thoſe that never looked into them; how neceſſary ſoever they be to the ſupport of the *Engliſh Monarchy*, the *Church*, of which he is a *Member*, & the *Salvation of his Soul*, which is of more importance, then theſe *Natural Experiments*. I could have with

Net modus ullus eſſe debet inveſti gandi veri: Et quærendi turpis deſatigatio, cum id ipſum quod quæritur ſit pulcherrimum.

with more confidence cryed out, *How beautiful* are his *Feet* and *Hands*, had I found him employed in the *Gospel-work*, than in this *Society*. But he gives me no cause for this Exclamation: that which follows is of so pernitious consequence. —— "Some of the *Reformed Churches* thought "themselves obliged to forbear all communion with them, "and would not give them that respect which possibly "might belong to so *Antient* & so *Famous a Church*. —— I am much to seek which of those that wear the name of *Reformed Churches* did ever hold it lawfull to *hold Communion* with the *Bishops of Rome*, and their adherents. For since the Question is not concerning *Civil Commerce* and Actions of *General humanity*, but concerning *Church-Worship*, and joyning with them in the *Sacrifice*, *Prayers*, and *Ceremonies* of their *most superstitious Mass* (to be present at and bear a part in the Service, and to receive the Sacrament are with them, as with the *Church* of *England*, tokens of the Church-Communion, and not the hearing of *Sermons*) and at other times *owning them as a Church of Christ*: Since this is the Question, I would willingly learn of our *Historian*, which of the *Reformed Churches* hath not forborn all *Communion with them* and taught it to be *necessary to do so*? It is true the Church of *England* hath upon very easy termes made way for the *Papist* to come to *us*, to *communicate with us*: The *Hierarchy*, the *Ceremonies* retained, the very *Liturgy* word for word being *so framed*, that whatever they hear or see at our *Service* is not repugnant to what *their Church* followeth; as Mr. *Hales* in one of his Sermons doth shew: And indeed they differ no more than a *Bible* with the *Apochrypha* from one which wants it. And this in great part is the foundation of our *Penal Lawes* against the *Papists*, because they do refuse to come to hear and assist in the *same Prayers* and service which their Church useth, or *only* condemns because it is not of the *Pontifical approbation*. If the *Papists*

Though Mr. *Sprat* teach us in this History that 'tis *uncivil* to condemn the *Religion of other Countries*: Yet the Apostles were not bred up to that *civility*.

Mr. *Chillingworth* teacheth, that it is impossible for any to hold

External Communion with the Church of *Rome* and not to Communicate with her Errors: and declares he never met with any *Protestants* that held it lawfull, but he lived not to see our *Inventors* nor this *History*.

should *comply* in the manner *demanded* with the *Church of England*, it might then be said indeed that they Communicated with us; But not that we *held Communion with them*, except we likewise *resorted to Masse*, joyned with them in their prayers, and participated there; which is a thing our Homilies, the Articles of our Church, nor (I think) any of our *Church men* ever taught, nor could *it be done* without danger of strengthening *them in their Superstitious and Idolatrous waies*, and the hazarding of the whole interest of the *Kingdome of Christ* as it is lodged in the *Protestants*, they being apt thereby to be ensnared, and from a mixing *Fellowship* with *God* and *Belial* come at last to fall into *Popish Idolatry*.

1 Cor: cap. 10. ver. 20, 21.
2 Cor: cap. 6. ver. 15, 16.

Certainly neither the *Antiquity* nor the *Fame* (Arguments so powerful with Mr. *Sprat*, but so ridiculous, so extrinsecal to truth, and Baffled by all *Protestant Divines!*) can warrant this procedure. This the *Papists* are aware of, who shew no such regard to the Ancient and Famous Church of *England*. And it is evident that Errors are not the more *tolerable*, but the more *dangerous* for being *Ancient*. Could antiquity or Fame give Credit to impious Communion or Civilities, how ought we to *Reverence* that *old Serpent*, whose Antiquity, whose *renown*, whose *extent of Dominion* is such, that all which Mr. *Sprat* so much admires, and *Pleads for*, is but a *part* of it. Mr. *Sprat*, Mr. *Sprat* let me tell you and some of your fellow-*Virtuosi*, that there is a tenderness *for those without* which is *Cruelty* to *those within*: and that you must have a care how you *destroy those who profess the Gospel and for whom Christ dyed*, to gratify such as live in opposition to him in all the *Offices* of his *Mediatorship*, & to whom he will say at the last day, *I know you not, be gone you workers of iniquity*. But I shew too much of the *Divine*, whilst our *Historian* shews so little: but I could not dispense with this *Passage*: and I wonder how it ever could be permitted in such a piece: *lest it* should be thought to be the Judgement of that *Illustrious Society*, and that they were making way for the Introducing of som thing else besides

beſides a *New Philoſophy*. It is a Caution which the *Apoſtle* Suggeſts unto me, *Take heed leaſt by any means this liberty of yours become a Stumbling block to them that are weak. For if any man ſee thee which haſt knowledge, ſit at meat in the Idols Temple: ſhall not the Conſcience of him that is weak, be emboldned to eat thoſe things which are offered to Idols? And through thy knowledge ſhall thy weak brother Periſh, for whom Chriſt dyed? But when ye ſin ſo againſt the bretheren and wound their weak Conſcience, ye ſin againſt Chriſt*, 1 *Cor: cap.* 8. *ver.* 9, 10, 11, 12.

"I can only apply my ſelf to that *good Nature*, which "a Great Man has obſerv'd to be ſo peculiar to our *Na-* "*tion*, that there is ſcarce an Expreſſion to ſignify it in "*any other Language*. —— This Notion about *Good Na-ture* hath ſo delighted Mr. *Sprat* that in his Diſcourſe againſt Mr. *Sorbier*, he thought fit to propoſe it to the world, and here to repeat it again. In that Diſcourſe he makes *this Obſervation* to be an Inſtance of the pro-found *Criticiſme* of the Earl of *Clarendon* But cer-tainly never was a great Miniſter of *State* ſo abuſed by an ill defence as that Honorable perſon was, when ſuch poor things were alledged in his Commendation, he ſee-med more depreciated by his *Apologiſt*, than by his *Adver-ſary*. I am apt to believe that the *Great-man* (yet whoſe *Great-neſs*, did ſcarce ſurpaſſe that of Sir. *Tho: Moore*, or the Lord *Bacon*, to whom Mr. *Sprat* compares him) had other Ex-cellencies then a *Criticall* knowledge of *Ancient or Modern* "*Languages*. But Mr. *Sprat* ſaies this of him —— There "is Scarce any Language in the world, which can pro-"perly ſignify one Engliſh expreſſion, and that is *Good-*"*Nature*. Though Monſieur *Sorbier* will not allow the "*Noble Author of this Note* to have any Skill in *Grammer* "*learning*, yet *He* muſt pardon me, if I ſtill believe the *ob-ſervation* to be *true*. —— I know not how kind Monſieur *Sorbier* may be unto *him*, and how he may practice a quali-ty which is ſo *hard to be Expreſſed*: But I am ſure, I cannot indulge him in this Conceit: for if the *French* do not ſignify the ſame by *un homme de bonne Nature et homme d'un bon*

Hiſt: of the *R. S.* Pag. 61.

naturel: I am ſure that one ſhall find that the *Greeks* do equal the Emphaſis of our *Engliſh* in that of Ἐυφυὴς, and tranſcend it in the word Καλοκάγαθος. What other Languages may do, it is for Mr. *Sprat*, and others to *determine*, without underſtanding them; I care not to render at preſent ſuch teſtimony of my *folly*.

If any be not ſo good a Grecian as to be convinced of the Signification of Ἐυφυὴς let him but read what *Hen. Stephanus* in his *Theſaurus Ling. Grec.* ſaith of it and he will no longer doubt.

Miſtakes

Miſtakes about the SWEATING-SICKNES, *and its* Cure.

TO ſhew the great Utility of the *Royal Society*, he ſayes "They will be able by degrees to "purchaſe ſuch *Extraordinary Inventions*, which "are now cloſe lock'd up in *Cabinets*; and then to bring "them unto one Common Stock, which ſhall be upon all "occaſions expoſed to all mens uſe. This is a moſt *Heroick* "*Invention*; For by ſuch concealments, there may come "very much hurt to mankind. If any certain remedy ſhould "be found out againſt an *Epidemicall* diſeaſe, if it were "ſuffer'd to be engroſs'd by one man, there would be "great Swarms ſwept away, which otherwiſe might be "eaſily ſav'd. I ſhall inſtance in the *Sweating-Sickneſs*. "The Medicine for it was almoſt *Infallible*: But, before that "could be generally publiſhed, it had almoſt diſpeopled "whole Towns. If the ſame diſeaſe ſhould have returned, it "might again have been as deſtructive, had not the Lord *Bac-* "*on* ta-ken care to ſet down the particular courſe of Phyſick "for it in his Hiſtory of Henry the *Seventh*, and ſo put it be-"yond the poſſibility of any private man's invading it. This "ought to be imitated in all other Soveraign Cures of the "like nature to avoid ſuch dreadful caſualties. Hiſt: of the R. S. Pag. 75.

One would think by the words of our Hiſtorian, That the Cure of the *Sweating-Sickneſs*, were recorded by *no Body* but the Lord *Bacon* that *it was almoſt Infallible*; that the *Sweating-Sickneſs did not return again*; And that the *Cure* was rather *concealed* (and needed to be generally publiſhed) at firſt, then to be diſcovered by *Obſervation* and *Experiments* of thoſe that *firſt* fell ſick. But there is no ſuch thing: for the *ſame cure* is related by *Polydore Virgil*, and *Holinſhed* in *their Hiſtories of Henry the Seventh*. And the ſame ſickneſs did rage in the twenty ſecond year of the *ſaid King* his Reign, as well as the firſt. And the *Cure* related was ſo far from being *almoſt Infallible*, that my Lord

Bacon only ſaies it *commonly recovered the ſick*: and after it was ſo generally known, yet the twenty ſecond year of that Kings Reign, many dyed of it (as *Holinſhed* ſaith) *howbeit not in the ſame number, by reaſon of the remedy found out at the beginning of it*. To convince the Reader of the truth of what I ſay, and to ſhew how unacquainted this *Virtuoſo* is in our *Engliſh Chronicles*, I ſhall ſet down the words of the Lord *Bacon*, of *Holinſhed*, and of *Polydore Virgil*.

Lord *Bacon* Hiſt: of *H*. 7. *pag*. 9.

"It appeared by *Experience*, that this diſeaſe was rather "a ſurpriſe of nature, then obſtinate to remedies, if it "were in time looked unto. For, if the patient were kept "in an equal temper, both for clothes, fire, and drink, "moderatly warme, with temperate Cordialls, whereby "natures work were neither irritated by *Heat*, nor turned "back by *Cold*, he commonly recovered. But infinite perſons "dyed ſuddenly of it, *before the manner of the Cure, and attendance was known*.

Hollinſhed Hiſt: of *H*. 7. in the beginning.

"At length by the *diligent obſervation* of thoſe that eſcaped (which *marking what things had done them good, and holpen to their deliverance, uſed the like again*. When they "fell into the ſame diſeaſe a *ſecond* or *third time*, as to divers "it chanced) a *remedy* was found for that mortall Malady, which was this. If a man on the *day-time* were taken "with the *Sweat*, then he ſhould *Streight* lye down with all "his *clothes* and *Garments*, and continue in his Sweat "twenty four houres, after ſo moderate a ſort as might be. "If in the night he chanced to be taken, then ſhould he *not riſe* out of his bed for the ſpace of twenty four houres, "ſo caſting the cloths that he might in no wiſe *provoke* "the Sweat, but lye ſo *temperatly* that the water might "diſtill out ſoftly of the ovvn accord, and to abſtain from "all meat, if he might ſo long ſuffer hunger, and to take no more

" more drnk (neither hot, nor cold) then would mode-
" ratly quench and aſſwage his thirſty appetite. Thus
" with luke-warm drink, temperate heat, and meaſurable
" clothes *many Eſcaped*, Few which uſed this order (after
" it was found out) dyed of the Sweat: marry, one point
" diligently above all other in this Cure is to be obſerved,
" that *he never did put his hands or Feet out of the bed to refreſh*
" *or cool himſelf*, which to do is no leſs jeopardy than
" death.

Polydor. Virgil. *Hiſt. l. 26. Henrici* Septimi.

Eodem anno novum morbi genus pervaſit totum regnum, ſub primum Henrici *in inſulam deſcenſum, dira quidem lues, & quam nulla ſit ætas antea, quod conſtet, perpeſſa: ſubitò enim ſu-*
" dor mortifer *corpus tentabat, ac ſimul dolor caput Stomachum-*
" *que vehementi caloris ardore affectum angebat. Quo in mor-*
" *bo homines qui a principio erant, quia alii æſtus minus patien-*
" *tes, ſi in lecto erant, Stragula dimovebant; ſi veſtiti, veſtes de-*
" *ponebant; alii ſitientes frigidum potum ſumebant, alii demum*
" *patientes caloris fœtorisq; nam ſudor grave olebat, additis ſtra-*
" *gulis, ſudorem provocabant, æquè omnes aut illicò, aut non multo*
" *poſtquam ſudare cœpiſſent, moriebantur, ita, ut ex omni agro-*
" *tantium numero, vix centeſimus quiſque evaderet. Neque*
" *ulla interim medicorum ars aut ſcientia quicquam opitulabatur,*
" *quin morbi novitas omnem illorum excluderet peritiam. Verùm*
" *poſt viginti quatuor horas (tanto temporis ſpacio vis ejus*
" *morbi durabat) abeunte ſudore, nonnulli confirmabantur: non*
" *eo tamen ita expurgati erant, quin iterùm atq; iterùm in*
" *morbum recidirent, multiq; inde perirent. Sed ea vis reme-*
" *dium tanto malo ad ultimum monſtravit: nam qui ſemel primo*
" *ſudârant, cum deinde rurſum ægrotarent, obſervabant ea quæ*
" *in primâ curatione, profuiſſent,* et illis pro remedio utentes,
" *addebant ſemper aliquid ad curationem utile. Item et illi iidem*
" *cum iterùm in idem valetudinis genus incidirent, ex priore*
" *obſervatione earum rerum, per quas ſe confirmaſſent, ita ſe cu-*
" *rare didicerunt, ut vim ſudoris illius facilè tolerarent. Quibus*
" *rebus ita uſu venit, ut poſt ingentem mortalium ſtragem reme-*

"*dium vnicuiq; promptiſſimum inventum ſit, quod hujuſmodi eſt,*
"*Siquis interdiu ſudore corripiatur, cum veſtitu protinus cubatum*
"*eat: ſin noctu, et in lecto, tum quieſcat, nec ſe è loco moveat, uſque*
"*ad viginti quatuor horas exactas: interim ita ſe ſtragulis oneret,*
"*quò non provocetur Sudor, ſed ſua ſponte molliter ſtillet, cibi ni-*
"*hil capiat, ſi tam diu famem tolerare poſſit, neque plus potionis*
"*conſuetæ ac calefactæ hauriat, quam modicè ſatis ſit ad ſitim ex-*
"*tinguendam; inter hanc curationem inprimis caveat, ne manum*
"*quidem aut pedem ſui refrigerandi, recreandique cauſâ, extra*
"*ſtragula proferat, quod facere letale eſt. Hoc remedium eſt*
"*novo morbo inventum, qui tantum Angliam id temporis per-*
"*vaſit et poſthac ſæpè graviter afflixit.*

Thoſe of the *R. S.* that underſtand no more than Engliſh may compare the account of *Hollinſhed* (or *Hall* in his Chronicles) with that of the Lord *Bacon*; the more learned may conſult *Polydore Virgil*, and if they pleaſe *Fracaſtorius de contag. l. 2. c. 5. Pareus de peſt. l. 25. c. 5. Hollerius de morbis intern. l. 2. c. de ſudore. Langius Ep. l. 1. Ep. 19. Beverovicius de. med. veter. part. 3. c. 3. pag: 222. Tho. Cogans haven* of health. *pag*: 272. & *Senertus de Febrib. l. 4. c. 15.* All of them will be preſently ſatisfied how little the Phyſicians are beholden to the Lord *Bacon*, as if he alone had recorded that *Cure*, which ſo *many* beſides have committed to writing. Nay it will appear that the account he delivers of that *Cure* is very imperfect, and ſuch as none but ſome ſuch inconſiderate *Virtuoſo*, would have *acquieſced* in; much leſs have recommended. For whereas the *others* direct *that the ſick party if dreſſed in his cloaths*, ſhould immediatly lye downe, without ſo much as adventuring to put of his cloaths: This Circumſtance, of how great *importance* ſoever is totally omitted: and I think that great *caution of putting the Hand* or *Foot*, or any part of the body out of bed, *or into any cool place* (which they all ſo ſeverely inculcate) is not ſufficiently intimated in that expreſſion, of keeping themſelves in an equal temper, both for clothes and fire. And whereas they ſay *the Patient*, muſt refrain from all meats, if poſſible, for 24 hours, which leaves the party at liberty, to comply with the vital indication, in caſe

They were not to ſleep during the *twenty four hours*, as *Tho. Cogan* obſerves in the place aforecited: and ſo doth *Cains*.

caſe of extremity, otherwiſe not; of this our renowned Lord makes no mention, nor that the ſame perſon might have it twice, or thrice; which is a material obſervation; nor mentions he the ſtench of the Sweat, and other Symptomes.

Some having had it twice, died the *third* time of it, as *Cogan* relates.

But concerning the *Nature* and times of the *encreaſe*, *State* and *decreaſe* of the *diſeaſe*: and the manner of feeding, and giving drink to the ſick (they gave them *Beer*, *Ale*, *Wine*, as well as other *Juleps*) according to ſeveral exigencies and occaſions (upon the obſervation whereof depended their *recovery*) it would be too long to tranſcribe the paſſages in *Caius*; and yet without the knowledge thereof this *almoſt Infallible medicine* would ſignifie nothing, or as little as we ſee *good medicaments* now do, when they fall into the Hands of a *little dabler in Phyſick*, who boaſts himſelf a *Virtuoſo*, or an admirer of *them*. But in thoſe daies when *Caius* himſelf attended, and more *particular directions* were publiſhed in Engliſh for the inſtruction of the people, yet an infinite number of *Rich* (moſt of *them*) and *poor* were ſwept away. *Quoquò te vertiſſes, cadaver conſpexiſſes. Continuus undiq; nolarum æncarum pulſus, confuſus ſonus erat.* So *Caius*. Whoſe Book I do recommend to all inquiſitive perſons, as containing ſeveral *Curious* as well as *neceſſary* obſervations: nor will I doubt to ſay that if all that ever my Lord *Bacon* writ, were put into the Scales, (and the *Hiſtory of the R. S.* and all their diſcoveries caſt in) that ſingle treatiſe of *Caius* for *Utility* would out-weigh them all, and *deſerves* to be ſecured from Oblivion by *publick Authority*, leaſt what afflicted this Nation ſo miſerably at ſundry times for *fifty* years ſpace, ſhould returne again, and produce as direfull effects as ever.

When I reflect upon this *remedy* as it is recommended to our admiration, and imitation by this *Hiſtorian*, methinks I begin to doubt that thoſe *perſons* will hardly be *punctual* in their own *Relations*, who have the confidence to obtrude upon us *ſuch an imperfect one* from *another*. I queſtion not but we are more ſecured by *Holinſhed's* having ſet it down, than by its being inſerted into the Hiſtory of the Lord

Bacon, the works of the former will be ſo much more valued then the latter by our Nation, as long as they have any Judgment. The truth is the Lord *Bacon* is like great piles, when the Sun is not high, they caſt an extraordinary ſhadow over the Earth, which leſſeneth as the Sun grows verticall. In the account of the *Sweating-Sickneſs*, what underſtanding Phyſician can read without laughter the Character he gives of the diſeaſe. *It was a peſtilent Feaver, but* (as it ſeems) *not ſeated in the veins or humors, for that there followed, no Carbuncle, no purple or livid Spots, or the like, the maſſe of the body not being tainted: only a maligne vapour flew to the Heart, and ſeiſed the vital Spirits, which ſtirred nature to ſtrive to ſend it forth by an extream Sweat.* But *Polydor Virgil* and *Holinſhed* prudently decline the controverſy about the nature of a *Peſtilential Feaver*, and only tell us that *A deadly burning Sweat ſo aſſayled their bodies, and diſtemper'd their blood with a moſt ardent heat* (they being ſick in head and ſtomach) *that ſcarce one amongſt a hundred that ſickned did eſcape with life.* He that tells me the diſeaſe is a *Peſtilent Feaver*, and the Sweat is *an effect* of *nature* endeavouring to *expell* the Malignity: puts me upon ſome thoughts that I ſhould not have, if I took the Sweating to be the primary diſeaſe, or a Symptome conſequential to *its Malignity*. And whereas our Lord ſaith *Nature did ſtrive to ſend forth its virulency by an extream Sweat*: I find not any ſuch thing, for all that recovered were recovered by the continuance of a moderate Sweat: This experience and obſervation taught them; and the Phyſitians, imitating thoſe operations of nature, did adviſe them unto it. All *Extream Sweats* either Spontaneouſly happening, or procured by Art, were *Mortall*. As to the Seat of the *peſtilential venome*, it ſeemed not to that *Lord to be in the Maſſe of blood and humors, but only in the vital Spirits.* And *why?* becauſe *there followed no Carbuncle, no purple or livid Spots or the like.* Is it then neceſſary that whenſoever there is a *Peſtilential Feaver*, which affects the Maſſe of *blood*, that then there muſt be ſome cutaneous eruption, by *botch, Carbuncle* or *Spots?* No Phyſician will ſay it. *Nonnunquam evenit*

evenit, ut in febre manifeſtè Peſtilenti, ac forté cæteris maligniore, neque papulæ, neq; tumores, neq; ulla naturæ depulſio conſpicia Maſſarius *de febrib. c.* 24. But that the Seat of this diſeaſe was *Principally* or ſolely to be placed *in the Maſſe of blood and humors* appears, firſt from the occaſionall external cauſe of it, a moiſt ſeaſon preceding, which multiplyed the like humors in the people; Next it is evident from the *Symptomes* that attended it, particularly the *horrid ſtench* of the *Sweat*, which iſſued from them that were ſick of it: of which *Polydor Virgil* takes notice. *Sudor Britanicus eſt quidem Diarius, quia Spatio viginti quatuor horarum perficitur; ut tamen non ob id ſub verâ febre diariâ, quæ ex Spiritibus calefactis et putridis Fiat, collocari poteſt. Nam referunt Britanni medici, et proximi Belgæ, quod non ſolum ægrotantes ſudant, multoq; ſudore perfundantur, verumetiam quod ſudor iſte eſt fœtentiſſimus: ad hæc urinæ lividæ apparent, ac valde corruptæ, ſanguiſq; aliás per veſicam excernitur plurimus, alias effluit per nares, quin et per aures, quandoq; etiam per oculos ſtillat, Ex quibus colligitur putrifactionem eſſe in ipſis humoribus, alioqui laborantibus ſolis ſpiritibus urina non mutaretur, nec ſanguis adeo copioſè efflueret.* Septalius *de peſte l.* 1. *c.* 21. I have have been thus particular about this diſeaſe, thereby to take of the repute a little of my Lord *Bacon*, as he fell in my way, whoſe ſteps our *Society* pretend to tread in; and that *ſo exactly* as even to *miſtake* where *he* did. If any ſhall reply in behalf of that Lord, that *He was no Phyſitian*, and that in an Hiſtory, we are not to expect an accurate relation of any diſeaſe and its Cure; I ſhall willingly allow of the *Anſwer*; but I muſt not allow Mr. *Sprat* that *excuſe*, who (*not owning the preſcription to be any where elſe*) remits us to the Lord *Bacon* for a Cure for the Sweating-Sickneſs, which is *almoſt Infallible*, and the preſervation whereof in that book, ſecures the world from incurring the *like hazard again*: which it might have done, had the receipt fallen into the hands of ſome avaricious *Doctor of Phyſick*. Becauſe

Ephemera benigna eſt, Anglica febris maligna et peſſima, et ſymptomata habet horrenda, ſudorem perpetuum, lipothymiam, cordis palpitationem pulſus frequentiam, et inæqualitatem: adde quod tanta ſudoris copia, tam longa convaleſcentia in his qui evadunt, humores infectos in ea febre indicant eſſe. *Roderitus a Fonſeca* method. cur. febr.

here is such adoe about a receipt, and that the *Society* promise us to record many more, (fully as good as this!) I shall inquire into the success of this *almost Infallible Medicine* a little further. That the *Sweating Sickness* did rage again in the twenty second year of the Reign of *Henry* the seventh, I have already shewed out of *Hollinshed*, and of the *success* that *Method* had in curing it, which was indeed such as might give a *reputation* unto it, though not so great as our Historian fixeth on it. About nine years after, *An. D.* 1517. in the Reign of *Henry* the eighth, the *Sweating-Sickness* did much infect the Kingdome again: and since it cannot be imagined that in so short a time the people should have forgot a *Medicine*, which they are observed to have remembred *twice as long* before, let us see what effect this *almost Infallible Cure* produced.

It is observed by Dr. *Caius* who lived and writ during the last Sweating-Sickness, that it raged five times in this Nation. First in the year 1485. from the beginning of *August* to the last of *October*. This is the time Mr. *Sprat* relates unto. A second time in 1506. during the Summer. A third time in 1517. from *July* to the middle of *December*. A fourth time in 1528. during all the Summer. A fifth time in 1551. when it lasted above five moneths, beginning in *Shropshire* about *May*.

Herbert in *H.* 8. *An. Dom.* 1517.

"Truely *the disease* (notwithstanding this "Course!) *was of that malignity, as within the space of three* "*hours it killed! This caused the King to leave* London, *and* "*adjourning three Termes*, 1517. *to remove* Trinity-*Terme*, "1518. *to* Oxford *where it yet continued but one day and was* "*adjourned again to* Westminster. *Nevertheless divers* "*Knights, Gentlemen and Officers of the Kings Court died there-* "*of, as the Lord* Clinton, *the Lord* Grey *of* Wilton, *and others* "*of quality; the Vulgar sort so commonly perishing, as in some* "*towns it took away half the people, in others the third part.*

Jo. Speed in *Ed.* 6. Sect. 65.

"*The* same disease *again brake out under* Ed. 6. 1550. *It* "*raged extreamly through the land, wherein died the two* "*Sons of* Charles Brandon, *both of Dukes of* Suffolk, *be-* "*sides an infinite number of men in their best strength; it* "*followed only English men in Forreign Countries, no* "*other people being infected therewith, whereby they* "*were both feared and shunned in all places where they* "*came.*

What *Speed* saith concerning the *Sweating-Sickness*, that it at that time pursued the English abroad, without infecting the Forraigners where they sojourned; this is confirmed

firmed unto us by the learned and accurate Dr. *Caius*, who ſaith that it purſued (in the daies of *Ed. 6.*) the Engliſh every where, into *Scotland*, *Holland* and *France*. So that it was in vain for any of them to fly their Country. As to the Forraigners, even the *Scots* were not infected with it though living in England at that time: nor did the diſeaſe then ſpread abroad ſo as that the diſeaſed Engliſh ſhould infect the Nations they fled into, or converſed with. He obſerves alſo that in 1529. When the *German* ayre became infected with a *peculiar ſort* of *malignity* (which yet did not difference the diſeaſe in its Symptoms or Cure) the ſame Sickneſs did ſeiſe the *Dutch*, and not the *Engliſh*, *viz. Hi noſtro aere & contagione non læduntur, ſed ſuo: nos non ſuus illorum ſed noſter inficit.*

It were eaſy to proſecute this argument further, and to ſhew the vanity of this *almoſt Infallible remedy* (though amplified with all the circumſtances any *Phyſitian*, except Dr. *Caius*, ſets down) eſpecially when it falls into the hands of *Empiricks*, and men of little reading; But I think ſuch labour altogether needleſs to my preſent purpoſe; and it is a *Supererogation* of my kindneſs to the *Vertuoſi*, that I give them this enſuing caution. He that would cure this diſeaſe as becomes a *Phyſitian*, muſt not rely upon one method alwaies eſpecially in malignant diſeaſes, but attend to the *differences* of *humane bodies*, *different ſeaſons* of the years, and other accidents which alter mens bodies; and where *humane ſearch* failes us in the diſcerning of the *Cauſes* of that *ſenſible difference* that is obſerved to be in the *ſame diſeaſe* at *ſundry times*, he muſt, with *Hypocrates*, have recourſe to the τὸ θεῖον, in other caſes to *Diſ-Syncraſies*. Thus in ſome years the *ſmall Pox* is fatall, notwithſtanding the *beſt Methods*: In *other times* ſo gentle, that any Nurſe can cure it. Some years the *Plague* and *Peſtilentiall Feavers* are cured by *Vomiting*, *bleeding*, *purging*, and *Sweating*; In other years *Vomiting*, *Purging*, *Bleeding*, and *Sweating*, have proved pernicious: I ſhall illuſtrate this out of the two great *Plagues* which happened at *Leyden*, in the *Netherlands*, one in 1624, the other in 1635. In the *Firſt* Plague, all

that had *botches* behind their Eares, under their Armepits, or in their Groine, upon the applying of a veſicatory in a convenient place, and the botch being ſuppurated, and the matter evacuated by the adjoyning veſicatory, the botches vaniſhed without breaking, the malignity and matter contained in the botch venting it ſelf by that other paſſage. In the latter Plague, although upon the applying of bliſters, the ſick amended, and the malignity ſeemed exhauſted, yet did all the botches *ſuppurate* and *break*. In the *firſt* Plague all Women that during their being ſick of the Plague, happened either *orderly* or *accidentally* to have their *Menſtrua*, and all that had the Plague, and did *miſcarry* there, theſe generally died: But in the ſecond Plague, it was quite otherwiſe, many women recovered notwithſtanding their *abortion*; and moſt women eſcaped that had thoſe *Menſtrua*, though it were *Symptomatically*. In the *Firſt* Plague, all that had *purple*, *livid*, or *black* Spots dyed, almoſt. But in the *ſecond*, many eſcaped who had thoſe *Marks*. This *Henricus Florentius* relates upon his *own knowledg* in his additaments to *P. Paaw. de peſte. c. 2. pag. 47.* and with this paſſage I ſhall cloſe up this Animadverſion, referring all inquiſitive perſons to *Forreſtus* and *Schenkius* in their obſervations upon this diſeaſe; whoſe *Cure* is ſo layed down by them out of *Caius*, *Tyengius*, *Viſſenacus* and by *Tho. Cogan*, by *Pareus*, *Sennertus*, *Langius*, *Claudinus*, *Hollerius*, *Langham* in his Garden of health and others, that any one that is *Maſter of a General and diffuſed method of Phyſick*, *acquainted with the generall rules and cautions* and who by a *variety of reading* is acquainted with the *Multiplicity* of *malignant* and *Peſtilential Feavers*, and that infinite diſcrepancy that is obſerved in them, in their *Types*, *Beginning*, *Progreſs*, *Event*, and *Cure*, ſhall not be at any loſs in that diſeaſe, ſhould it return again, otherwiſe then what *human imbecillity* and the intricacy of the *thing* ſubjects him unto. But his *Method* I doubt will not be *almoſt Infallible*. But! what is all this to the *Hiſtorian*?

Hiſt. of the R.S. Pag. 77. "It was the fear of being circumvented, that made one "of our wiſeſt *Kings* delay *Colu[illegible]* too long, when he came

"came with the promiſe of a *new world*: whereas a little "more confidence in his Art, and a ſmall charge in furniſh- "ing out ſome few ſhips would have yearly brought all "the Silver of the Weſt-Indies to *London*, which now ar- "rives at Sevill,

I do not wonder that our *Hiſtorian* hath not read *Holinſhed* and *Polydor Virgil*; but how can he be excuſed for not being converſant in the Lord *Bacon's* Hiſtory of *H.* 7. whoſe words are theſe *pag.* 189. "It is certain that the *Kings* "fortune had a Tender of that great *Empire* of the *Weſt-* "*Indies*. Neither was it a *refuſall* on the Kings part, but "a delay *by accident*, that put by ſo great an *Acqueſt*. For "*Chriſtophorus Columbus* refuſed by the King of *Portugall* "(who would not embrace at once both *Eaſt* and *Weſt*) "imployed his Brother, *Bartholomæus Columbus* unto "King *Henry* to negotiate for his diſcovery, And it ſo "fortuned that he was taken by *Pirates* at Sea, *by* "*which accidentall impediment*, he was long ere he came to "the King; *So long* that before he had obtained a Capi- "tulation with the King for his Brother, the enterpriſe by "him was atchieved, and ſo the *Weſt-Indies* by *Providence* "were then reſerved, for the Crown of *Caſtilia*. Yet this "ſharpened the King ſo, that (not only in the voyage of "*Sebaſtian Gabato*, but) again in the Sixteenth and Eigh- "teenth year of his Reign he granted forth new Com- "miſſions for the diſcovery and inveſting of unknown "Lands.

I do not find *by this Hiſtory* that the King did ſuſpect *Columbus* for a Cheat, or put any *delayes* upon him becauſe he was not ſatisfyed with *his Art*. His Brother having been taken and detained by the *Pirates*, this *Columbus* applyed himſelf to the King of *Spain*, and had Tranſacted with him and finiſhed his voyage, and firſt diſcoveries, before *Bartholomæus Columbus* could arrive and finiſh his Capitulation with *H.* 7. But had that *prudent King* doubted of his Art in a Caſe *not yet tryed*, where the *Diſcovery* ſeemed as *uncertain* as were the length and *incommodities* of the voyage: and where the grounds upon which *He* went,

 ſeemed

seemed meerly *conjectural*, how could he be blamed? For whatever private Intelligence *Columbus* had from a *Spaniſh* Pilot (that dyed in his houſe) or otherwiſe, *he* (being more deſirous to make his Enterpriſe the *Child* of his *Science* and *Fortune*, then the *follower* of a former diſcovery) repreſented no other aſſurances that all was not Sea from the Weſt of *Europe* and *Africk* unto *Aſia* but *Seneca's* prophecy, or *Plato's* antiquity, or the nature of *Tides* and *Land-winds* and the like. The Lord *Bacon* terms them only *Conjectures*, and theſe *Gentlemen* who hold that in thoſe daies there was no Philoſophy about the *Winds* and *Tides* whereupon one would rely, and thoſe antiquities of *Seneca* and *Plato*, being but the dotages of two *Fooles* credulous and apt *to conclude too ſoon*, ſhould not condemn the *deliberate procedure* of *that King*. Eſpecially ſince the diſcovery of the *North-Weſt* though grounded upon better *conjectures* (as my Lord *Bacon* ſaith) then thoſe of *Columbus*, proved uneffectuall in the voyage of *Sebaſtian Gabato* whom the *King* did furniſh out with a ſhip not long after: and ſo hath the proſecution of the *North-Weſt* paſſage ſince that. I think I could evince further out of the condition that *England* was then in, not being ſo populous as of late years, the *Scots* being un-aſſured, *France*, *Spain* and the Houſe of *Burgundy* emulating, if not hating him, and the *Fleets* and *Navall power* of England being nothing to what it hath *lately* riſen unto, that (conſidering our Scituation in compariſon of *Spain*) it was not ſo eaſy a thing as he imagines, to have poſſeſſed the *Weſt-Indies*, and effected that trade and commerce which the *Caſtilian* is now maſter of: but I ſhall not digreſs ſo farr.

Animad-

Animadversions upon the *History* of making *SALT-PETRE*, which was Penned by Mr. *Henshaw*.

THis History of *Salt-Petre* hath so many *defects* in it, that I wonder any one should offer *such an account* to them, and am more surprised to see it approved *by them* and inserted into their *History* as a *Specimen* of their *Narrations* for the world to Judg how *accurate* and inquisitive the *Society*, and its *Members* are. The Narration is not only *imperfect*; but in many parts *false*, so that for ought I can discerne, the *History* of *Nature* which they propose to themselves, will not merit any more Credit (if so much) then that of *Pliny*: and these *Experimentall Philosophers* instead of *undeceiving* the age as to *inveterate Errors* will *multiply new ones*. We are told in their *History* with "what caution they proceed in their Experiments, in "the *making* of them, and in the *repeating* them: they ob- "serve all the *Chances* and the *regularities* of the procee- "ding; what nature does *willingly*, what *Constrained*; what "with its *own power*, what by the succours of *Art*; what "in a *Constant rode*, and what with some kind of *Sport* and "*extravagances*; industriously marking *all the various shapes* "into which it turnes it self when it is pursued, and by "how many secret passages it at last attaines its end; ne- "ver giving it over till the whole *Company* has been fully "certified of the *certainty*, & *constancy*, or on the other side "of the absolute impossibility of the effect. *This Critical* and "*reiterated Scrutiny* of those things which are the plaine *ob- "ject of their Eyes*, must needs put out of all reasonable dis- "pute the reality of those operations, which the *Society* shal "positively determine to have succeeded. —— Nay, they "tell us that there is not *any one thing* which is now appro- "ved and practised in the world, that is confirmed by

Hist. R. S. Pag. 160.

Hist. R. S. Pag. 99.

Pag: 100.

"*ſtronger evidence* than this which the *Society* requires; ex-
"cept only the *Holy Myſteries of our Religion.* Whether he intend to preſent the *Holy Myſteries of our Religion* as *fabulous* and *ridiculous* I cannot tell: but whoſoever ſhall reflect upon this *Similitude* and examine the realty of their *Experiments*, and particularly of this concerning *Salt-Petre*, which is a common thing, and the *Inſtance* of their *care* and *exactneſs*, will hardly entertain any kind thoughts of theſe *Projectors*. Juſt as I was writing this, Mr. *Bagnall* had his workmen employed about the making *Salt-Petre* at *Warwick* and *Coventry*, whereupon I conſulted with the Operators and received the ſubject of theſe following *Animadverſions* from them.

As to that Queſtion which he firſt propoſeth, *whether the Salt-Petre which we uſe now, and that of the Ancients, be of the ſame Species?* He might have encreaſed the Catalogue of ſuch as deny it, by adding *Quercetan* in his diſcourſe of *Gunſhot-wounds*, and *Braſſavolus* in his Treatiſe of *Purging* medicines: *Ioel* in his diſcourſe of *poyſons*. As for *Scaliger*, he diſtinguiſheth betwixt *Nitre* and *Salt-Petre*. He ſaith and *proveth* it that the *Nitre* of the Ancients, is not a thing *loſt totally*, but common to be had in *Aſia* and *Egypt* and even in *Tuſcany*. And *Porerius* ſaith, he gathered it in ſeveral places about *Bononia*, and particularly in *Monte Paderna*. And if *Langius* be the Author Mr. *Henſhaw* cites (I never heard of any writer called *Longius*, and am apt to believe it to be a miſtake of the Printer) it is plain that he reckons our *Salt-Petre* as a *diſtinct Species*, and not as the ſame with *that other* of the Ancients. *Eſt et alia Nitri Species* (marke that!) *artis induſtriâ parata, quæ ex ſtirijs frigore in lapidibus parietum aut teſtudinum concretis, ſenſim diſtillantibus, ſaxis et cæmento accreſcit, aut ex putrida et ſalſuginoſa in ſtabulis terra, veterinariorum urinâ conſperſa decoquitur. Novum inventum, veteribus Medicis ignotum.* The diſtinction that *Scaliger* makes betwixt *Salt-Petre* and the *Nitre* conſiſts in the *tenuity of their parts*, and upon the ſame ground he diſtinguiſheth *Salt-Petre* from the number of *Salia Foſſilia*, or Salts digged out of the Earth. *Tantum abeſt, ut ſal petræ ſit ſal Foſſile, ut*

De ſubtil. exercit. 104. *Sect* 15.

Pharmacop. Spagyric. l. 1. 7.

Epiſt. l. 2. *Ep.* 32.

et a Sale et a Nitro diſſet partium tenuitate. Tam enim ſal quam Nitrum ita uritur, ut cineris quippiam relinquatur. Salpetra univerſum abſumitur ab igni. What the judgment of *Cardan* may be, I know not; But *Untzerus* doth give his reaſons why our *Nitre* and theirs ſhould not be of the *ſame Species*. Becauſe that theirs was ſuch as might be *eaten with meats*, and commonly *drunk with wines*; it was of a *roſy colour*, bitter, light, Spungy, and of an *Earthy Nature*. Whereas our *Salt-Petre* hath none of theſe qualities. As for thoſe that hold the *Affirmative*, their number is not ſo *great* as he repreſents them to be, nor is the *general vote of learned men* ſo favourable to that opinion. But the controverſie is laid aſide, becauſe we have none of *that Nitre* brought over unto us. Should it happen once to be ſo, or that we ſhould meet with any *Veins* of it or *Nitrous Waters* in *Europe* where it were to be digged or made without Lixiviating, it is not to be doubted but there would ariſe ſeveral diſputes about the *Mineral* it ſelf and the bodies, that ſeparate from it upon *refining*. Since there is a great difference in the *Salt-Petre* of ſeveral grounds in *England*, and ſome having a greater proportion of *Common Salt* than others have, and ſome abounding much more with *Sal Armoniack* than others, as the *Barbary-Petre*, or that which is caſt out of the Earth in *Italy*, or hangs upon old Stone walls in *England*: whereas that which *is* made by boiling, participates not at all of the nature of *Sal Armoniack*. And that *many little differnces* in the *Petre* beſides theſe, might have been offered to the conſideration of the *Society*, and found out by them in order to the improving of Gunpowder, is certain: but they are not ſo *ſerious*, as they pretend. And whereas Mr. *Henſhaw* ſaith that the reaſon why the *general vote of learned men hath been moſt favourable to that opinion of their being but one Species*, was "becauſe "that in all Latine Relations and, preſcrip-"tions, the word *Nitrum*, or *Halinitrum* is moſt "commonly uſed for *Salt-Petre*. I do not believe any "man ever gave that reaſon: For the word *Nitrum* is of

ubi ſupra.

de Sal. c. 18.

Peterius Pharmac. Spagir. l. 1. c. 7.

The *Peter* of *Houſe-floors* and the like which abounds with *Common Salt*, can never be ſo *refined* as to *burn*, or be ſo effectual, as that of better Soyl. The common Salt being in part inſeparable.

Greekish originall, νίτρον & λίτρον. The Greeks and Latines cald that peculiar sort of Minerall, *Nitre*, which was in some places digged out of the *Earth*, in others made by the *Sun* operating upon little *Canales* made out of the *Nile*, and oftentimes it was cast up of it self *out of the Earth* (or bred there) in manner of a hoar frost, as it is now in the *Indies*, and *Barbary*; the *Arabians* called it *Baurakh* and mention two sorts, that of *Armenia*, and that of *Africk*. When the use of *Gun-powder* had rendred *Salt-Petre* so advantagious a commodity, and that modern Artists had found out this way of extracting it out of Earth by Elixiviating it, they gave it the same appellation that the Ancients did to their *Nitre*, and came to use promiscuously the Names of *Nitre* and *Salt-Petre*, both sorts of *Nitre* being equally subservient to their ends, and being in a manner all one after refining; although *Curiosity* might be able to multiply distinctions from the *different manner of productions*, and different *constitutive principles* that occur daily in the making *Salt-Petre*. They were the more induced to give out *Salt-Petre* the same name with the Ancient *Nitre*, because that they had continued the name of *Nitre* to the same sort of *Minerall*, though sometimes occurring in a *white* colour, sometimes *Black*, sometimes *red*: sometimes they had it *naturally* produced; sometimes it was *artificially* generated in their *Pooles* or *Canales*: Sometimes it was of so *hard* a consistence as not to dissolve easily in *water*; sometimes it was *soft*, of a loose texture, and as it were *froathy*. From this consideration the moderns thought it no *incongruity* if they gave the *same name* to their *Salt-Petre*, which the Ancients had given to a *Minerall* of so *resembling a nature*. So *Botallus* saith. *Quanquam adhuc sub judice lis est, num hoc nostrum Nitrum*

Avicen. con. med. l. 2. tr. 2. edit. Plempeii p. 71.

I here argue as if our *Salt-Petre* which is Extracted out of Earth by *Elixiviation*, were unknown to the Ancients. And I confess that notwithstanding what *Tartaglia* and *Semienowicz* say (whose words I shall relate anon) I can not perswade my self but that if they had been acquainted with so strang *a Phænomenon* in nature, they would at one time or other have taken notice of this as well as of other waies of gaining *Nitre*. That none should either directly or casually let fall a word that might convince us that they knew *it*, is a strong presumption they were ignorant of *it*: and though there be no records that tell us when or by whom it was invented, yet it is more easy to comprehend how it should be a *moderne discovery*, and yet the Author unknown (a common accident!) then how it should have been known so long and yet never spoken of by those who have even in the making of *Salt* and *Nitre* taken notice of as minute circumstances.

Nitrum idem ſit quod veterum, ſenſus tamen indicat hoc facultate illi haud abſimile eſſe. So *Quercetan* ſaies, *Salpetræ noſtrum a Nitro diverſum eſt, niſi quod qualitatum communionem forte quandam cum illo habet, quemadmodum ſales omnes inter ſe communionem quandam habent. de vulner. Sclopet. Sect.* 10. We ſee in *common Salt* how great a variety is comprehended under the ſame *appellation*. Some is white, ſome black, ſome bay, ſome red, ſome purple, ſome digged out of the *Earth*, ſome made by the *Sun*; Some is boild to its conſiſtence; in the *taſt* there is great difference; ſome more *pleaſantly Salt* than others, ſome *bitter* and ill taſted. Some Salt hath *a rank ſmell*; ſome none at all; and in the effects and uſes to which *Salt* is applyed, there is ſo great a variety and diſcrepancy that we may juſtifie our calling the Common *Salt-Petre* by the name of *Nitre*. In the mean while it is apparent that the Latines could not uſe the word *Nitrum* or *Halinitrum* for that *Salt-Peter* which we commonly make; and they muſt be very *ignorant perſons* that could avow our *Salt-Petre* and the *Nitre* of the Ancients to be of the ſame Species, becauſe that *in all Latine Relations and preſcriptions the word Nitrum* or *Halinitrum* is commonly uſed for (ours? or another kind?) *Salt-Petre*. If ever they had any ſuch it was called *Aphronitrum et Spuma Nitri*: and not *Nitrum*.

vide Laurenbergium in aphor. Sal, c. 18.

But however Mr. *Henſhaw* hath done leſs then one would have expected in the foregoing diſcourſe; he would have done more than I, or any other, towards the determining the Queſtion concerning *Salt-Peter*, whether it were the *ſame* or *no*, with that which the Ancients uſed and called *Nitre*. Let us liſten to our *Vertuoſo*, and marke how much the Members of the *Royal Society* ſurpaſs all others of the number of *Literati*. "*If*, ſaies he, *I could have got any* "*Egyptian Nitre at the Drugſters, I doubt not but I ſhould have* "*been able to have put an end to that Queſtion*, by a Demon-"ſtration, *that is by turning the greateſt part of it into Salt-Petre*. Here I muſt firſt inform our *Experimentall Philoſopher*, that the Ancients had more ſorts of *Nitre* beſides that of *Egypt*, as the *Armenian*, *African*, *Roman*, *Babylonian* and

Hiſt. of the *R.S.* Pag. 161.

Untzer. de Salt. c. 18.

and *Macedonian*; and as to that of Egypt, perhaps besides that *fouleneſs* which is likely to adhere unto it by reaſon of the muddineſs of the Nile, there might be ſo much of *common Salt* in it, as would render that part of his aſſertion falſe, wherein he ſeemes not to doubt but to turn the greateſt part of it into *Salt-Petre*, His own Citation out of *Pliny* (*pag.* 263) evidenceth that the *Nitre* of Egypt was the worſt, and moſt remote from our *Salt-Petre*. And when he ſhould have done all this, Yet would his DEMONSTRATION be ridiculous, and be laughed at by every yong Sophiſter. I ſhall ſhape the Argument for him by which the Queſtion is to be decided.

Pliny and *Kircher mund. ſubterran. l.* 6. *Sect.* 2. *c.* 1.

ſay that the Egyptian Nitre is ſo ſolid that it is cut out into Veſſels. So the latter. *Nitrum juxta Cairum calore Solis toſtum in lapidem, vaſis conficiendis aptiſſimum convertitur.*

Egyptian

Egyptian Nitre may be turned into ſuch *Salt-Petre* as ours is *Ergo, That Salt-Petre which is now in uſe, and that which the Ancients uſed, is the ſame.*

TO paralel this Argument; is not this as good an inference, I can turn *Sublimate* into *Mercurius currens* or *Quickſilver*; ſo as that the *moſt part* of it be *ſuch*: *Ergo*, there is no difference betwixt *Mercurius Sublimatus* and *Quickſilver*; and *Ergo*, whoſoever makes uſe of *crude Quickſilver* makes uſe of *Sublimate*. Or, is not this as good a Demonſtration, *I can turn the greateſt part of Salt-water into freſh*: *Ergo*, *Salt-water*, and *freſh* are the *ſame*: and they that drink the *former*, and they that drink the *latter*, uſe one and the *ſame* drink. Or may I not demonſtrate that the Ancients did *ſeaſon their wines*, and *Eat* that which our workmen call their *raw liquor*, and put the Queſtion out of doubt thus. I can turn *Egyptian*, *Armenian*, or *Macedonian Nitre* into *Salt-Petre*: I can turn the *raw liquor* into *Salt-Petre*: *Ergo*, the *raw liquor* and the other *Nitre* are all one, and they did eat (not *drink*!) this *raw liquor*. I am ſo well pleaſed with theſe kind of *Demonſtrations*, that I cannot but ſuggeſt more of them viz. I can turn *Gunpowder*, the *greateſt part* of it into *Salt-Petre*: *Ergo Gunpowder* is no new invention: & the *Nitre* of the *ancients* & our *Gunpowder* were the *ſame*. Or, I can turn native *Cinnabar* even farre the greateſt part, 13 *ounces* of *ſixteen*) into *running Mercury* or *Quickſilver*: *Ergo*, the *Cinnabar* and *Mercury* are *all one*, and whoſoever uſeth or diggeth up the one, doth *in Specie*, uſe and dig up the *other*. But, what if Mr. *Henſhaw* had lighted upon ſuch impure *Egyptian Nitre*, as upon refining had yielded *more* of *common Salt*, then of *Salt-Petre* (which I ſhall ſhew to be poſſible enough) had he then Demonſtrated the point? Or would it not have been made *evident* that the *Nitre* of the Ancients

cients, and our *Common Salt*, had been all one? and that when they uſed the *one*, they uſed *indeed*, nay *in Specie* the *other*?

But Mr. *Henſhaw* though he could not get any *Egyptian Nitre*, is apt to think that the Ancients did not underſtand the way of refining their *Nitre*, as we do: and that hence ariſe the different deſcriptions of their *Nitre* and our *Salt-Petre*: which I grant to be true; but yet thoſe *acceſſionall Corpuſcles* of ſo many *different natures*, participating of the natures of *Earth*, *common Salt*, *Allom*, and *Salt Armeniack* (and God knowes *what* elſe) make a very great difference betwixt the *one* and *other*, ſuch, as in the common *naming* of things (even by *Philoſophers*) may well ſerve to rank them as *different*. They will not have the *ſame colour*, nor the *ſame taſt*, nor burn in the *ſame manner*, nor appear in the *ſame figures*; they will not ſerve for the *ſame uſes*, being Chymically Analiſed, they will not yeild the *ſame conſtituent principles*. In fine, and upon which the controverſie moſt depends, It will never appear that *they were both made the ſame way*. So that Mr. *Henſhaw* by his *Demonſtration*, had no way ended the controverſie.

To ſhew the differences betwixt theſe natural productions of *Nitre*, & what *Art* generates, conſider that paſſage of *Kircher*: *in mund. ſubterran. l. 6. Sect. 2. c. 3. Nitrum non purum tam continet ut plurimum tres ſubſtantias, Alumen, Salem crepitantem, et Nitrum eſſentiale, quæ ex ejus diſtillatione reperiuntur: Alumen quippe calcinatur cum fervore quodam et ebulitione: Nitrum purum inflammatur conſumiturq; Sal crepat, exilitq; probat id guſtus Aluminoſus Salſus, nitroſus* — and a little after. *Non eſt Mineralium mixtorum fodina, aut vena metallica, cui neſcio ſane qua inſita ambitione non aſſociatur Nitrum. Inter cætera Sali, Alumini Ammoniaco, cæterisq; Salibus, veluti, cognatione, proximis ſibi non tantum adnaſcitur, ſed ea ſuis ditiiis implet.*

To ſhew *his Ignorance* a little more, I would have him to know that the Ancients had not only *dark coloured* and *ſtony Nitre* (which he informes us of out of *Pliny*) but *white*, and of thoſe other *colours* I mentioned out of *Hofman*, and he out of *Galen*. And that the *Armenian* and *African Nitre* would have made more for his purpoſe, ſuch as *Avicenna* and the *Moores* did uſe. And that the *Moores*, did either refine their *Nitre*, or Nature in *Barbary* was kind to them in producing better than yet we receive thence, will appear from the account of *Nitre* or *Baurakh*, which the *Prince* gives.

Nitrum

Nitrum probatiſſimum eſt Armeniacum, leve, cruſtoſum, friabile, ſpongioſum, albo, aut roſeo, aut purpureo colore, mordax: et Africanum quidem Nitrum cum cæteris Nitri generibus comparatum habet ſe veluti Nitrum ad Salem. Non eſtur autem Nitrum niſi magnam gravemq; ob cauſam. Nitri ſpuma eſt tenuior Nitro, ejuſdemq; eſt poteſtatis. Laudatiſſima eſt vitrea (ſome read it molliuſcula) ac fractu Comminuiq; perfacilis. *Avicen: Canon med. lib. 2. tr. 2. pag. 17. Edit. Plempij.*

Inſigniter abſtergit, et abluit, præſertim Africanum, et abradit, et purgat, craſſos humores incidit. Atq; omnibus aliis Nitri Speciebus modica ineſt aſtrictoria vis ſimul et abſterſoria, levis propter ſalſuginem, quam habent, præter quam Africano, hoc enim nullius adſtrictionis eſt particeps, ſed purum putam abſtergens eſt et validum: Sali autem adſtrictoria ineſt poteſtas, ſed abſtertorica non niſi levis et modica.

Out of which it is evident that the *African Nitre*, was free from the mixture of *common Salt*, and came very near to our *Salt-Petre* (eſpecially the *Spuma Nitri*, which perhaps was *Criſtalls of Nitre*) in reſemblance and operation; but the *Armenian Nitre* was mixed with *common Salt*. But that they did Elixiviate it out of the Earth I do not finde.

In the end of this page he tell us *that in the refining of* Salt-Petre *there is beſides common-Salt, a certain greaſy Oil attending it, which doth by nature ſo wonderfully adhere to every part of the* Petre, *that the ſeparation of it is the ſole cauſe of the great charge and labour that is required to the refining of* Petre. This is true, but I cannot find that our *Salt-Petre men* do call that *Oil* the *Mother of Salt-Petre*, but quite another thing, which I ſhall explaine hereafter. Pag: 261. 262. Hiſt. of the R.S.

In that other way which is followed by Pietro Sardi Caſimirus Semienowicz and Agricola and other Forreigners, there is not that trouble in the making nor thoſe *Mothers* that occurre in ours.

I cannot but take notice of that citation which Mr. *Henſhaw* makes uſe of out of the Exercitations of *Scaliger*. *Subluſtris purpura quaſi Splendor quidem in Salis-Petræ terris ſæpenumerò eſt a nobis obſervatus.* This is perfect falſification of the text in *Scaliger*, & occaſioned by Mr. *Henſhaw* his not underſtanding well the Latin-tongue: *Scaliger* doth not hold that *Salt-Petre* is a *foſſile Salt* as he reputes the *Nitre* of the *De ſubtil: exer. 104. Sect. 15.*

Ancients to be; but to be a more *ſubtile* Efflorescence ſticking upon the rocks, and dried by the *Sun*, and therefore called *Sal Petræ*, differing from the other in ſubtility of parts, (as I related before) and hanging upon the ſtones like *Icicles* which are in Latin called *Stiriæ*, & *Cirri*: but Mr. *Henſhaw*, not knowing how to Engliſh the word *Cirri*, nor having Patience to learn, Subſtitutes *terris* for *Cirris*, the text running thus. —— *Sal foſſile Sale marino Craſſius eſt, tum propter coctionem, tum propter materiam: huic enim aquæ, illi terræ plus. Utrunq; autem ipſo eſt Sale-Petræ minus tenue. Sudor enim eſt a Nitri quibuſdam principiis ſecundum aliquam proportionem, ſed adeo tenuis, totus ut Spuma ſit, totuſq; abeat in ignem.* —— *Quod hæret rupibus, in quibus inſolatur, ac propterea Sal petræ dicitur, analogiam habet, atq; affinitatis naturam cum ipſo Nitro ſed aereum magis eſt, atq; ad Aphronitri potius veterum ſpeciem vergens. Etenim ſubluſtris purpuræ quaſi ſplendor quidem in Salis Petræ Cirris ſæpenumero eſt a nobis obſervatus.* Out of which it is manifeſt that Mr. *Henſhaw* altered the text groſly, and that *Scaliger* meant no more than to compare thoſe *Cirri* or *Stiriæ* or *Icicles* of *Nitre* with the *Aphronitrum* of the Ancients. And however thoſe *Cryſtalls* are *white* with us in our houſes, yet to evince that they may be as well of another colour, as the *Aphronitrum* deſcribed by the Ancients, he ſaith, he had often obſerved in the *Salt-Petre* as it *Chryſtalliſed* on the rockes a colour inclining to *purple*.

Hiſt. R S Pag: 262.

"And he that ſhall boyl a *Lixivium* paſt through a *Salt-*
"*petre*-Earth, up to a conſiſtence without filtring it through
"aſhes, or giving the Salt leave to Chryſtalize, may perhaps
"find ſomething not unlike the *Nitre* of the Ancients.

I never *thought highly* of the obſervations of *theſe men*, and Mr. *Henſhaw* here ſerves me with an *inſtance* ſo pregnant that I cannot paſs it by. He pretended in the foregoing page to much converſe with the *makers* and *refiners* of *Salt-Petre*, and to ſome curioſity in his *own Experiments* about it, but (alas) how vaine are his pretenſions! how ſuperficiall his enquiries and obſervations! how little of accurateneſs is there in thoſe *Scrutinies* which ought

ought to be ſo *Criticall* and *Severe*? where is that Certainty which we are to have from *them*, inferior to *no proofes*, but what convey unto us the *Holy Miſteries of our Religion*! He obſerved before that there was a certain *greaſie Oyl* in the *Minerall*; That Oyl is of ſuch a nature, that if it be not ſeparated from *Petre* it will never *Coagulate* into any *Cryſtalls*, or *imbody*: (I ſpeak of our *Petre* to which he referrs us) and it is his own own obſervation (*pag* 273) that after the *Salt-Petre* Liquor is Cryſtallized, there will remain ſome part of it that will not *coagulate*, being *greaſie* and *it muſt again paſs the aſhes before it be boyled, or it will never generate any Salt*. The truth is *Salt-Petre* is one of the moſt odde *Concretes* in the world, exceeding *Sugar*: And howſoever Nature, and the Sun in the Earth, or *Nitre-panns* at *Nile*, may tranſcend our Art in the production of it, (the peculiar *Aire* of the *Climate* concurring) yet with us it is not made with that facility Mr. *Henſhaw* here inſinuates. After the Workmen have extracted their *Lixivium* out of the *Earth* in ſuch manner as Mr. *Henſhaw* deſcribes; afterwards they boil that *raw Liquor* according to what he ſaies, two daies and a night: and when it is boiled to the height, *though it ſtand never ſo long in the cool*, it will not Chryſtallize or Coagulate into any Lumps or Maſs, notwithſtanding that it is impregnated with a *vaſt* quantity of *Salt-Petre* and *common Salt*, by reaſon of that greaſy Oyl: To evince this, there needs no more but this Experiment, which is well known to the *Salt-Petre men*; if any *one* will caſt a little greaſe, or tallow into the boiler, when the liquor is *paſt the aſhes* and depurated, and boiled to the heigth, it will hinder the coagulation of it, nor will it ever become *Petre*. This *Liquor* thus boiled up, and *as yet impure is* kept by them for the *Mother of Salt-Petre*. Having prepared this impure Liquor and boiled it up *as to a proofe* as they call it, they put it into a Tubb, which they call the Mother Tubb. And this will never coagulate, nor Cryſtallize, but is called the *Mother* of *Salt-Petre*.

This Experiment of caſting in the *greaſe* will not ſucceed in the refining, but in the firſt generating of the *Salt-Petre*. Beſides it will boyl over with that violence that they know no way to allay it: This happens more if *Soap* be caſt in.

And that for this reaſon, becauſe that to make *Salt-Petre*, they boyl another Copper-full to the juſt heigth, and when it is come to *that*, they put into it ſome of *this Mother*, and (as ſoon as it begins to boil) they lade away as faſt as they can the whole liquor into their Aſh-tubbs, which when it is paſſed through, it will at the ſecond boiling, let fall the *common Salt* and *Salt-Petre*, as he and I ſhall declare preſently. At *Warwick* they boiled nine tun of *raw liquor* at once, and when this proportion was boiled to an heigth, they put in about half a tun of the *Mother*, and ſo made it. This is the way to produce the *Mother* when they are deſtitute: But when they have once made *Petre*, they keep that Liquor which remaines after the *Cryſtallizing* in the *panns*, that is kept in *Tubbs*, and is called the *Mother of Salt-Petre*, and this they carry about with them whereſoever they go, thereby to ſave them the trouble of making *new* in the manner I deſcribed. Having declared thus much in order to the generating of *Salt-Petre* amongſt us, I leave my reader to judge how much Mr. *Henſhaw* clears up the matter by his imperfect accounts from *Barbary* and *Pegu* about the natural productions of *Nitre*. In which I obſerve that there is no account given of the nature of the *ſoile*, nor of thoſe *corpuſcles* that impregnate the *Aire* there, nor of the *times* of the year in which it is generated, nor of the influence that *change* of *winds* and *weather* hath upon it. Nor how deep the *veines* of it lie, whether it be only generated in the *ſurface of* the *Earth*, and *propagate downwards* or whether it *generate* lower and propagate *upwards*. Whoſoever ſhall make theſe reflections *with me* (and they are but neceſſary: I remember that where the *Sun* makes *Salt* in *Jamaica* at the *Salt-panns*, the times of the year and ſeaſons of weather made

This *Mother of Salt-Petre* is not ſo called, as if the Elixiviated Liquor having been boiled and paſſed the *aſhes* and after boiled to *a proofe*, would not let fall the *common Salt* and coagulate into *Petre* at all: but becauſe by theſe meanes it generateth a great quantity of *Petre* and the work is made much more eaſie. And it is obſervable that the *Mother* which remains after the generating of *Petre* is much more Efficacious then what is made otherwiſe. If the raw Liquor be, by negligence boiled too high it will become extream *Oily* or *greaſie* nor can it be cleared of it by aſhes, except it be put in as *Mother*, to other boilings, and ſo *paſs the aſhes*. If the *Mother* be put in *too ſoon* it ſpoils the *boiling*; and if it boil *is* after tis at the height, it will over the *furnace*.

made a great alteration) he will think that it is not for this *Vertuoso* to blame the *Ancients* : And let any man consider the account which *Pliny* gives, as Mr. *Henshaw* cites him, and he will find even *that man* (as much, and as justly as he is condemned) was more accurate then our *Historian*. And if the learned *Theodorus Collado* passed this Censure upon *his naturall History*; viz. *Opus recreandis curiosorum animis, non Erudiendis Scientiæ cupidis, idoneum: nec Philosophicum, nec medicum, sed Historicum. Vir equidem fuit Studiosissimus; sed aliis in rebus occupatissimus (assiduitatem autem in Studiis artis requirit in medico* Hypocrates) *Aliquamdiu causas actitavit, ut de ipso* Plinius *alter ad* Cæcilium (*at necessaria est in medico, ait* Hypocrates, παιδομαθίη, *didicisse artem à pueritiâ) tantum 56. Annos vixit, breve tempus: Junior Erat quum Scriberet;* (at ars longa) *Totum illud tempus distentus impeditusq; quâ officiis maximis, qua amicitiâ principum egit, in Germania militavit. Itaq; horis succisivis, ex variis collegit authoribus pulcherrima quæq; suo arbitrio, lectuq; grata in unum digessit, per capita, nihil ex suo attulit: sed non potuit per otii angustias res exactè ponderare, et elimare: Sæpè autores aut linguarum imperitiâ, aut sensus sermonum ignoratione, non intellexit, ut optimè in materiâ simplicium, Ruellius Dalechampiusq; annotarunt: in aliis partibus alii.* I say if this *Character* be Justly fixed on *Pliny*; what credit will *some* deserve who are farr inferiour *in parts*, in *Judgment*, in *learning*, and in *curiosity* to *Pliny*.

in append. adv. Laurentium *de Error practic. c.* 78 Sect. 6.

How will they be abused by *Artisans*, as *Pliny* by his authors? how much *knowledge* and *Skill* is requisite to enquire into the circumstances of *Mechanicall* productions? how much more to relate them? I could not avoid this digression, which any one will pardon, who considers what Just cause Mr. *Henshaw* gave me.

But I pray, which sort of the Ancient *Nitre* doth he think our *impure liquor* (if it were coagulated) would resemble? Since they had sundry sorts: as there be severall kinds of *Salt*, some digg'd out of the Earth; some made by the Sun out of Sea-water in the *Salt-panns*; some boiled out of Salt-springs; some made out of plants calcined: so there

were ſeveral ſorts of *Petre* very much differenced in taſt, colour, weight, ſhape; as I have ſhewed. The *African* was the beſt, and comes neareſt of all to the *Aphronitrum* of the Ancients. Of this *Aphronitrum* I ſhall adde as little to what Mr. *Henſhaw* ſaith, as he does to *Pliny*; they that have ſeen it can Judge better of it, then they who have not; but that which they found upon the rocks, and which *Scaliger* ſpeaks of, was much different from what we obſerve in *England* in Vaults, and Arched Cellars or Walls. For that with us ſeems to be but the tranſudation of the *Saline* particles of the Lime and coagulating with ſome corpuſcles in the aire, into an *hoare*, or *Chryſtalls*; Nor did I ever ſee any but what was *White*: nor could I obſerve it to ſtick naturally to the Wall but in dry weather or when I made conſtant fires in my Chamber at *Oxford*, where it grew on the Walls near the ground, the Earth being higher much on the outer ſides, then the floore within. At other times I ſuppoſed it too much diluted with moiſture to ſtick on the Wall. But their *Aphronitrum* was of other colours, and grew out of naturall rocks and Vaults, and ſuch was that which *Scaliger* ſaw. It is no ſtrange news that Mr. *Henſhaw* drew very good *Rock-Petre* out of thoſe *Stiriæ*: nor is it any thing remarkable that a *Phyſitian* in *Shrop-ſhire* ſhould frame a *Sal prunellæ* out of them, except he had given us an account of the differences betwixt that ſort of *Petre*, and the *common* ſort: As to the *Cures* he did with it, I would faine know whether they were ſuch as could *not have been done* without it? and whether they were effected by that alone? or with the concurrence of other medicines? If the laſt, how comes the *Cure* to be aſcribed to that *Sal prunellæ*? perhaps it was not Effected by it *at all* or *in part* only. If the *Cures* were ſuch as might have been effected *by other meanes*, or by other preparations of common *Nitre*, what ſingular news did his *Shrop-ſhire* Phyſitian tell him? Every man of underſtanding knowes that crude *Petre* is as good, or better than that which is prepared by that *calcination*, with *Brim-ſtone*. And it is an uſuall way of cheat with the Chymiſts by ſome little altera-

alteration in a Medicine, to pretend unto *Miraculous* diſcoveries in *Phyſick* and *ſuch Cures* as never man performed beſides, or before; and ſometimes *their* medicines are but *old ones* though boaſted for *new*. Such was that *Arcanum* of *Ivy-berries* which was whiſpered into Mr. *Boyle's* Eare for a *ſecret* againſt the *Plague*: which yet was not only the ſecret of *Helmont* (as he obſerves) but was commonly uſed in *England* in a Plague which happened *Anno Domini*. 1540. As my *old receipts* ſay. It is in the *Garden of Health*, and other *Engliſh* receipt-books that are in Print. It is in *Alexius Pedemontius's* ſecrets *lib*. 1. and out of him tranſcribed by *Antonius Schneebergerus* in his Catalogue of *Euporiſta* againſt the *Plague*. It is not eaſie to be imagined what a pudder *ſome men* make about a ſmall matter; and certainly much *learning* and *knowledg* were a thing very deſirable *in this age*, when a little goes ſo fart (being ſet off with impudence) and acquires a man ſo *great repute*.

" In the *torrid Zone* and barren deſarts of *Africa*, the ſands " are viſibly full of *Nitre*, and thoſe few Springs and Wells " that are to be found there, are *by that reaſon* ſo *bitter*, that " the *Moores* and their Camells are forced to make an hard " ſhift with them in their long journies. ——— I do not underſtand the force of the Argument for the *bitterneſs of the Springs* from the *Nitroſity of the ground*; ſince *Springs* commonly participate not of the nature of the *adjacent ſoile*, nor have their *Originall* where they *diſcover* themſelves: So *Salt-Springs*, and *Hot-ſprings* are found in places where the *cauſe* cannot be aſcribed to the *Soile*, by reaſon of the many other Springs thereabours that are of a different nature. And although *Baccius* be of his opinion, that the *bitterneſs of theſe Springs is from Nitre*: *plures inter Rubrum mare et Nilum amara aquæ inveniuntur, ob ſubſtantiam Nitri quod in illis maximè partibus abundat, ſaporis exactè amari.* Yet I cannot aſſent to it, for this reaſon, that neither the lake in *Macedonia*, nor *Nile* (in which *Nitre* doth naturally coagulate) neither of them are ſaid to be *bitter*: particularly the *Nile* is eſteemed the beſt water in the world *Suaviſſima illius fluminis aqua, quæ alijs omnibus videtur*

Hiſt. of the R. S. Pag. 264.

detur præferenda. Alpin. de med. Ægypt. l. 1. *c*, 10. Yet this *Nile*, (Mr. *Henſhaw* ſaith) waſhes the *Nitre* out of thoſe deſarts, and ſo becomes impregnated in ſuch manner, as is related. Beſides, *Salt-Petre* it ſelf hath no ſuch taſt; nor the *boiled liquor* of it: and *Fallopius* ſaith, that *Salt-Petre* is rather to be diſcovered in *waters* by it's *effects*, than *taſt*; For if it ever ſhew it ſelf to the *taſt*, it is by a certain *Saline purging*, and as it were a *gently* corroding acrimony, which affects the tongue, and with a quickneſs diffuſeth the freſh ſence of it, as *Salt-Petre* it ſelf does. If *Nitre* ever makes water bitter, it is by reaſon of ſome *heterogeneous* mixture.

Gabr. Fallop. de thermis c. 9.

Hiſt. of the *R. S* Pag. 265.

"He obſerves that *Lime* doth ſtrongly attract the corpuſ-
"cles out of the aire, which either are *Salt-Petre*, or make it. —— I wonder how this paſſage came to be approved of, ſince that when I made uſe of the like principles, in an account of ſome naturall *Phænomena*, relating to *Jamaica*, the publiſher of the *Philoſophicall tranſactions*, fixed a *Marginall* reflexion upon me as not ſolving the thing *Mechanically*.

He tells us that *Salt-Peter* is the *life* of *Vegetables*, and that the face of the Earth could not produce them, if it were not for this *Salt*. Yet (*pag.* 266.) he tells us that in clay, or Sandy Earth little of it is to be found: & it is certain that our clay-grounds (that are of a very Stiffe clay, as in *Northampton-ſhire*) yeild as good Corne as any in the world; and as good paſture ground, and feed as large ſheep, and as large a breed of Horſes, as this Nation boaſts of. And I have ſeen in places in *Jamaica*, where there is nothing of Earth or mould, but immediate rocks under the ſand, I have ſeen *prickled peares*, *Mangraves*, & other trees grow, and *Melons* alſo. So all grounds that are *Gravelly*, or full of *Springs* yeild no *Salt-Petre*, yet do they *abound* in *Plants*: and even in *pure water* Mints will grow very ranke, in which the proportion of *Salt-Petre* is very ſmall, as he confeſſes.

Hiſt. of the *R. S.* Pag. 266.

"Husbandmen might make double or treble the profit
"they uſually do of their *muck*, if they would lay it up un-
"der an *Hovell* or ſome *covered place* until they cary it out upon

" upon their Land. —— I would not have any man think that this improvement of a *muck heap* is the particular observation of a *Member* of the *Society*, for which all *Farmers* are redevable to him. It was a thing known long agoe, and published by the Writers of *French* and *English* Husbandry. Not to mention others, take the words of Sir *Hugh Plat*, who lived in the daies of *Queen Elizabeth*, in his *Jewel House of Art and nature*, pag. 94. " All those " simple Sorts that leave their *muck-heaps* abroad, and sub- " ject to the weather, shew themselves to be but mean *Hus-* " *bandmen*, and that they never tasted of any true natural " Philosophy. For the Rain that falls upon those *Dung-hills* " flowing down into the Vallies, doth also carry with it " the Salt of the *Dung*, which dissolveth it self with the moi- " sture: wherby the soil being afterwards laid abroad up- " on the land, doth little or no good upon it. But if thou " wilt not give credite to my Speech, yet mark how the " labouring Hind, when he carries his *Dung* to the Feild, " how in discharging of his loads he leaves it in cer- " tain heaps together, and a while after he comes to spread " it all over the ground, and layeth the same in equall le- " vell, and afterwards when the field happens to be sowed " with Corn, thou shalt alwaies find the Corn to be more " green and rank in those places where the same heaps " were first laid, (after they have lain there some reasona- " ble time) then in any other place in all the ground be- " sides: and this comes to pass by reason that the Rain " which fell upon them hath carried even the Salt through " them, and conveyed it into the Earth that was under " them.

" I have been told by an experienced work man, that no " place yeilds *Petre* so plentifully as the Earth in Churches. ---This was told Mr. *Henshaw*; but as *Experienced* a man told me, that it was *false*; & particularly at *Coventry* lately. *Pigeon-houses* yeild much more; and even here we must distinguish: for if a *Pigeon-house* be built on *Springs* or *Gravel*, either

Hist. of the *R. S.* Pag. 266. At *Coventy* in a Floor where they couched *Mault*, there was so much *Petre* that it was visible to the Eye in great-plenty: and the men came to desire the *Salt-Petre*-men to work it, because he found it prejudiciall to his *Mault* which was not so good as when the Earth was less *Nitrous*.

there will be none at all, or little *Petre*: The like distinction is to be used in reference to the Scituation of *Churches*: *Salt-Petre* is begot in the Earth by a kind of *fermentation*. Stiffe *Clay* hinders that, and *gravell* is either of nature that *imbibes*, and *destroies Salt*, or else it is too *open*, and so gives a *vent* for those particles to *exhale*, that should *ferment*, and by fermentation transmute or Combine themselves into *Petre*, as also derive some principles out of the *ayre*, which contribute thereunto.

Hist of the R.S. Pag. 266

"Let the Earth be never so good, if it be laid on a brick "Floor, or that is boarded, it will not be so rich in *Petre* "as if it have free communication with the Exhalations of "the lower parts of the Earth.—I am not satisfied that the streams arising from beneath concurre to the production of it, because that the generation of *Salt-Petre* begins at the top, and from the surface of the Earth *multiplies* it self by *fermentation downwards*, which is the reason that the *lower* you descend, the *less* you find; Mr. *Henshaw* confesseth that if the ground be good, it seldome exceeds ten Foot in depth; commonly but six, or eight Foot: In *Warwick* (which stands on a gravell) it descends not above one Foot, as they assured me, though it be rich in *Minerall* at the surface. Besides in *Warwick-shire* there were Pigeon-houses that were floored with stone and with pebbles which yeilded as much *Petre* in proportion as any others.

He might have observed that the more *Southward* you work for *Petre*, and upon the Sun (as they Phrase it) the richer the ground is in *Petre*. And how old Mud-walls gather so much *Petre*, that it hath countervaild the cost to pull some of them down, and after rebuild them. The Elixiviated *Ashes* laid in the *Sun* impregnated with the *Oile* and *filth* only, will in a short time breed *Petre* in the top, if no *Rain* fall.

"If the Earth tast *bitter*, he is sure to have good store of "*Minerall*. ——— This is not true, for the Earth hath not any bitter tast, but *Saltish* and pungent, with a quickness, such as is in *Salt-Petre*, Especially if you imagine in it a mixture of *common Salt* more or less, according as the Earth is.

He

"He that ſhall caſt Water upon a Ground fit to dig for
"*Petre*, will only ſink the Mineral deeper into the Earth; but Hiſt. of the R.S. Pag. 267.
"he that throwes Soap-ſudds on it, will quite deſtroy the
"*Petre* (as the Workmen have a Tradition) and it very well
"deſerves a further enquiry. —— It is impoſſible for Mr. *Henſhaw* to minde what he ſaies, I think. If any man caſt on *much water* into a *rich Earth*, the water will not waſh it only *deep* (water deſcends not very deep) but diſſolves the *Petre*, and Soaks quite away *with it*, for that time. As for the caſting *Soap-Suds* on the ground, that it deſtroys the *Petre* either for *ever*, or for that *time*, any more then much *water Spilled* would doe; it is but a fooliſh ſurmiſe: for ſhould one caſt *Soap-Suds* into the *Tubbs* as the *raw liquor* is extracting, it would do no harm; the greaſe thereof not deſcending with the liquor, but lodging in the remaining Earth. But ſhould any one caſt *Soap* or the *Suds* into the *boiling liquor*, it would not only boile over *irreſiſtably*, but never *coagulate*. So *Soap* (or *Sugar*) caſt into the *Churne* is obſerved by Mr. *Scot* to hinder the *butter* to come.

"That *Salt-Petre*, and the way of drawing it *out of the* Hiſt. of the R.S.
"*Earth*, now in uſe, was a moderne invention, is generally Pag. 267. 268.
"concluded by all Authors; but whether we owe it to
"chance, or the ſagacity of ſome great Witt, is as un-
"known, as the time when it was firſt diſcovered.

"It ſeems to have many years preceded the Invention
"of Gunpowder, which by the *Germans* is aſcribed to
"*Conſtantine Anclitzer*, or *Berthold Schwertz* a Monk of
"*Friburgh*, and was, in all probability, not long diſcovered,
"when the Inventor (as *Polydor Virgil* tells us) taught the
"uſe of Guns to the *Venetians*, at the Battail of *Foſſa Claudia*,
"when they obtained that notable Victory over the *Geno-*
"*veſes Anno* 1380. For there is mention made, both of
"*Salt-Petre* and *Aqua fortis*, in the writings of *Geber*, a
"*Spaniſh Moore*, and an *Alchymiſt*; but at what time he
"lived, is unknown, though it be certain, ſome hundreds
"of years before *Raymund Lully*, who lived about the year
"1333. and publiſhed ſome of his Books wherein he treats
"of *Salt-Petre* and *Aqua fortis*.

Vide Caſimirum Semienowicz Art: magn: Artell, l. 2. c. 1. Pag. 61

It is apparently falſe even out of Mr. *Henſhaw*, that *Salt-Petre* is no *modern Invention*. Nor can any man ſay ſo who knows that it is mentioned in the *Scripture*, in *Pliny*, *Ariſtotle*, *Seneca*, *Dioſcorides*, *Galen*, *Vitruvius*, *Philoſtratus* in the life of *Appollonius Tyanæus*, *Avicenna* and many others, too tedious to recount. Nor is it leſs impertinent, that a *Witt* ſhould ſpeak it as a ſtrange thing that *Geber* (who by the way, was no *Spaniſh Moor*, but an *Apoſtate Grecian*, as I ſhew Mr. *Glanvill*, and I believe never in *Spain*, but in the Kingdome of *Fez*; and living one hundred years after *Mahomet*, could not precede *Raymund Lully* but by very *few hundreds of years*) that *He* ſhould mention *Salt-Petre*: though the mention of *Aqua-fortis* in him carry ſomething of *remarque*. I demand of our *Vertuoſo* whether *Geber* ſaith that the *Salt-Petre* in his daies was *extracted* and made as now? If he do not (as I am confident *He uſed* the *African-Nitre* mention'd by *Avicenna* and others) what needed he tell us that *Salt-Petre* is ſpoken of by *Geber*, whereas he had before demonſtrated *it* out of *Pliny*, and ſhewed himſelf inclined to their Judgment who taught that our *Nitre* and that of the *Ancients* were *all one*?

A more *Logicall* head would have thus delivered the thing here propoſed by Mr. *Henſhaw*.

There are ſeveral *Mineralls* that are called by the name of *Nitre*, or *Salt-Petre*: betwixt which the more accurate (that is the *Ancients*) did diſtinguiſh; ſo that *one*, the more *impure* was called *Nitrum* and *Halinitrum*; the more pure *Aphronitrum*; the moſt pure *Spuma Nitri*, or ἀφρὸς νίτρου, as *Dalechampius* obſerves. The *Nitre* or *Halinitre* was in Lapideous bodies ſometimes digged out of the *Earth*, ſometimes made by the *Sun* in the *Nitraria* or *Canals of Nitrous waters*. Of this laſt ſome being a better ſort than others was called *Aphronitrum*, and was more freed from *common Salt*, and was gathered (as I may ſay) in the *Nitre pannes*, as it ſhot there in *Lumps*. Beſides this there was a third ſort of *Spuma Nitri*, which was the beſt of all: *Quæ maxime laudatur: antiqui negabant fieri, niſi cùm vos cæciderat pregnantibus nitrariis, ſed nondum parientibus*. So that it ſeems

Plin. l. 31. c. 10. lit. H.

Vide Galen. de Simpl. medic. l. 9.

Pliny l. 31. c. 10.

ſeemes they took the firſt ſmall looſe concretions for the *Spuma Nitri* before they came to larger *Chryſtalls*, or *lumps* & *ſtones*: upon which account *Galen* ſaith it is like to *wheat Flower*. Of this fine *Spuma Nitri* (which I confeſs is ſometimes *Aphronitrum*; but not with *Acribology*) it was found afterwards that it might be had in *Vaults*, diſtilling from the ſtones in *Ice-ickles*. And from hence, as alſo becauſe it was found tranſ-ſuding and coagulating on rocks, it came to be called by the Barbarous *Latines* after the *Moores* had taught them *Phyſick*, and the *Materia Medica*, by the name of *Sal-Petra*. Beſides theſe waies of finding *Nitre* there is another way of making *Nitre* out of *Elixiviated Earth*, which upon refining is brought to that purity as to equall the beſt *Spuma Nitri* and *Salpetræ*, the Earthy particles and *heterogeneous mixtures* of *common Salt*, and other corpuſcles that diverſified the *taſt* and *colour* and *qualities* of the former *Nitres*, being *generally* ſeperated from this: *Art equalling, if not exceeding the productions herein of Nature*. How much the *Salt-Petre* of the *Ancients* differed from *ours*, is not now to be diſcuſſed anew: certain it is that the Invention of *Salt-Petre* (in it ſelf) nor of any of thoſe natural productions of the *Spuma Nitri*, is not *moderne*. Nor did *any Author in the world*, till *theſe* appeared, *conclude ſo*. But as to this *Elixiviated Salt-Petre* whether it be the *ſame* with that which the *Ancients* commonly ſpeak of, hath been quëſtioned; and I have already illuſtrated the point. And whether the *Ancients* were acquainted with the preſent manner of *Extracting and refining it out of the Earth*? this hath been diſputed by many; and it is affirmed by moſt to be a *moderne Invention*, yet ſo as that *Tartaglia* ſaith *they knew it as plainly as they did Betony*. And the already mentioned and moſt diligent writer about Gunpowder ſaith. *Quod autem exiſtiment nonnulli hunc Salem noſtrum Pyrotechnicum eſſe recenter adinventum illud maximè falſum eſſe, vel hoc unicum argumento eſt, quod hiſtorici fide digni inventorem Pyrii pulveris vel ſummis laudum deprædicent encomiis, vel tot convitiorum execrationumq; nominibus proſcindant, non quod Salis Nitri novum aliquam inveneri*

vide Semienowicz. ubi ſupra Pag 63.

See his judgment hereafter, in his diſcourſe.

Caſimir. Semienowicz art. magn. artiller. part. 1. l. 2. c. 1. pag. 63.

venerit Speciem ad perniciem Extirpationemq; humani generis, ſed quod novum, necdum antehac uſitatum pulveris nitrati, ex certis Nitri (jam tunc optime noti) Sulphuris carbonumq; portionibus mixti commentus fuerit compoſitionem. This Book was Printed at *Leyden* in 1650. and from hence any man may Judge how *true* that generall expreſſion of Mr. *Henſhaw's* is, that *generally all Authors conclude it to be a modern Invention*: and how impertinent that allegation of his out of *Geber*, and that oſtentation of learning, is, in computing the time of *Geber* and *Lullie's* lifes: wherein he miſtakes too, for if we abſtract from the authority of *Leo Afer* (to which I ſubmit) it is not certain (or rather it is manifeſt to the contrary) that there did ſcarce intercede *two Centuries* betwixt *Geber* and *Lully*, if ſo much.

vide Eraſtum de metall. Pag. 111.

As to that he ſaith about the Invention of *Gunpowder*, it might have become our *Vertuoſo* to have compleated his *Hiſtory*, by taking notice of what our Country-man Dr. *Read* ſaith of it before that *German Monk*. I will endeavour herein to ſupply his omiſſion of a paſſage that hath ſomething of *curioſity* in it.

Dr. Alexander Read of wounds Sect. 15 Pag. 107.

" *Bertholdus Niger, Schwarth*, or *Black* by Sirname. *Anno* " 1380 a Franciſcan Frier, and an Alchymiſt, found out " the making of *Gunpowder*, and *Ordnance* which are now " in uſe: He only *perfected* this miſchiefe: for the uſe of " *Guns*, although *rude*, was before: For in the time of *Caro-* " *lus Magnus*, *Gamoſcus*, King of *Friſland*, killed the Count " of *Holland*, and two of his Sons with a piece, and *Roger* " *Bacon* who died about the year of our Lord 1284. maketh " mention of *Gunpowder*. *Naucleru*s affirmeth *powder* and *Ord-* " *nance*, to have been Invented in the daies of *Otho* the " Fourth, *Innocentius* the third, in the year of the Redemp- " tion of mankind, 1213. *Froiſſard Anno* 1340 and 1353. " maketh mention of Guns. *Petrarcha* who died *Anno* 1374. " doth the like. (*a*) You may read in the Hiſtory of *Alp-* " *honſus* King of *Caſtile*, when he beſieged *Algezira*, a famous " town of the *Moors*, 3 *Aug. Anno* 1342. that they in the " town ſhot out of it bullets of Iron out of *Ordnance* accor- " ding to *Mariana*. Yea *Petrus Matterus* affirmeth that Braſs

(*a*) *Sethus Calviſius Chronolog.* Pag. 752. *Co.* 2.

Brass *Ordnance* have been used by the *Chinoies* many ages ago. So that the Frier was not the *Inventor*, but *Perfecter* of *Guns* and *Powder*. I have not opportunity to inquire into the citations of Dr. *Read*, but if I had been to write the History of *Salt-Petre* and of *Gun-powder*, I should have thought my self obliged to *this inquiry*, as much as to that which Mr. *Henshaw* begins with concerning the *Nitre* of *the Ancients*.

Here I must make a Protestation about the making of *Salt-Petre*, that I will not be understood to oppose Mr. *Henshaw* in any way, but such as is commonly followed in *England*; there is another manner of ordering it in *Agricola de Re metallicâ lib.* 12. page 454. which if it produce any *Phænomena* different from my observations, I do transfer all the *discrepancies* upon the variety of the process, and profess my own integrity and Candour in what I suggest. It ought to suffice that the men Mr. *Henshaw* converted with all, and those that made it at *Warwick* did take the same course. Pag. 268. That of *Agricola* doth agree with that of *Petro Sardi*, which I have added in the end of this discourse.

"If you are curious to know how rich your Liquor is before boiling, you may take a glass-viall, containing a quart, fill it with the common Water you use, then weigh it exactly; next fill the same glass with your liquor, and find the difference of weight which compared with the quantity of all your *liquors*, will give you a very near gues, how much *Salt-Petre* you are like to make by that boiling.——— This is a very *vain Experiment*, and at best can hold true only in the *richest mould* that is found in *Pigeon-houses* in which there is little of the *Cubique* or *Common-Salt*. It seldome happens that their *raw liquor* contains nothing but *Petre*. They have oftentimes as much of *common Salt* as *Petre*, sometimes *more*, as in the *raw liquor* drawn from the *floores of some houses*. But besides the *common Salt* there is the mixture of other *filth*, and the *greasy Oile*, which will render the weight uncertain: except we think that the *Salt* in the *Ashes* supplies all that is lost in the *percolation*. It had certainly become our *Vertuoso* to en- Hist. of the R. S. Pag. 269

If the *raw liquor* be made with the *two parts* extracted from *Pigeons* Earth, and *one* out of floores and the last contain much *common Salt*, the *Pigeon-houses liquor* cuts out (as they call it) or *transmutes* even that *Salt*, so as that there will be little or none in the end.

quire what became of that *greasy Oile*; and what happens to the *Alcalisate Salt* in the *ashes*, since it is turned into *Salt-Petre* in the operation; at least it is certain that as it is *totally* drawn out in the *percolation*, so it doth not turn into *Cubique Salt* except the *raw liquor* be of a *peculiar* sort; as I have said.

Hist. of the R. S. Pag. 270.

" When you have boiled it up to that height, that a " little of it flirted off the finger upon a live Charcoal, " will flash like *Gun-powder* (which for the most part falls " out to be after two daies, and a nights boyling.) ——— It is strange that any man should write such a thing as this: first, let the *liquor* be never so rich of the *Mineral* which seldom happens, and void of *common Salt*, yet will not that (no nor the most refined *Petre*) flash like to *Gun-Powder*. Secondly, where the *Cubique* or *common Salt* abounds in it (be it more, or be it less) it burns more slowly, and will certainly *Sputter* in the burning. In fine, *this* onely *Sparcles*, being flirted into the fire: the other tryall, by seeing that it is boiled high enough, *if it hang like Oile on the sides of the brasen Skummer*, is false: for if it be boiled so high, it is too *fat* to be recovered by passing the *Ashes*, and must be used as *Mothers*.

" At what time upon triall an hundred weight the of li- "quor containes about thirty five pound weight of *Petre*.— This is often times *false*, if ever *true*: for if the *liquor* hath more or less of *common Salt*, the product of *Salt-Petre* varies accordingly. And I say, it is seldom (if ever) true, because that in *Warwick*, they seldom had two hundred weight of *Petre*, out of Nine Tunne of *raw liquor*, yet did they never boile it near to that proportion in the *copper* which would agree with his computation.

" Fill up your Tubs with any sort of wood ashes. — He forgets here the putting in of the *Mother of Salt-Petre*: of which I have spoken already. And in his prescription *of any sort of wood ashes*, there is an omission of a considerable circumstance: for those *ashes* are best which abound most in *Salt*, of which there is a great difference: I remember in *Jamaica* to have tasted the *ashes* of several woods, and found scarce

ſcarce any Salt in them; and the *Aſhes* of *oak* only the *Petre-men* term'd a *dead aſhes*: and *Chymiſts* generally obſerve that *Lignum-vitæ* yeilds little of the *fixed Salt*. If the places where the *Salt-Petre-men* do work, do not yeild them *aſhes of wood* that may ſerve their turne; they uſe then either the aſhes of *Broome* burnt as it is *green*; or (which is no *wood*!) the aſhes of *green ferne*, or *bean-ſtraw or peaſe-ſtraw*, which need not be burnt *green*; the older the better: they are better then *wood-aſhes*: Concerning the reaſon of their burning the *Broom*, and *Fern* green, I could ſuggeſt ſome remarkable obſervations, as to the different quantities of *Salt*, (and conſequently of vertues) in plants before their coming to *maturity*, or full growth; but I ſhall Satiſfie my ſelf now with ſhewing the *miſtakes* and omiſſions of Mr. *Henſhaw*, whereof this is one, of which I ſhould have ſpoken (living in a place where the much uſe of the *aſhes of green Ferne*, in waſhing, gives people occaſion to obſerve the difference of *Ferne* at *ſeveral growths*, and the difference betwixt thoſe *aſhes* and *others*) but he gives me no occaſion.

Zwelfer. in Pharmacop: Auguſtan: de Sale Ligni Santti.

All woods ſay our *Petre-men* if burned *green*, yeild a *Salter aſhes* then otherwiſe. But for *aſhes*, the *Aſh* is beſt; the young *thorne*, Second; the *Elm*, third; *Firrs* and *Fern* burnt *green* (the younger the better) yeild a *Salt-aſhes*; if dry, not ſo. Hence thoſe *aſhes* are not uſed in *bucking* of Linnen. The *Salter* the *aſhes*, the *lighter*. If they lye *dry* a while, or till they be old they are the better for *Petre*, They gather *Saltneſs* by lying.

" Note that toward the end of your boiling, there will " ariſe great ſtore of Scumme and froth, which muſt carefully be taken off. —— He might have told us what uſe this is good for: if this *Scumme*, and the *aſhes* through which the *liquor* is percolated (*inſipid*, but impregnated with the *greaſy Oile*) be put into any convenient ground, they will generate there *Salt-Petre* in a ſhorter time, and much greater quantity then otherwiſe would be found there. Beſides, if there riſe ſuch great ſtore of *Scumme* and *Froth*, (which muſt needs vary as the *raw liquor* is more or leſs *fowle*) how ſhall any man conjecture, by weighing his *raw liquor* againſt *common water*, at the quantity of *Salt-Petre* he is to receive?

Hiſt. of the R. S. Pag. 271.

" Uſually about that time it lets fall ſome *common Salt* to " the bottom which you muſt take up with the ſaid *Scum-*

Ibid.

ner. —— If there be a great quantity of *common Salt* in it, it falls almoſt all to the bottom, during the boiling: what remains of *common Salt* in it, granulates againſt the ſides as it cooles, which at *Warwick* they ſuffered to be done in the *Cauldron*, without any diſtinct *Tubb*; what an obſervation did our *Vertuoſo* looſe here concerning the diſcovery of *two ſo* different *Salts*, at firſt ſwimming and mixing *indiſcernably* in the *liquor*; and afterwards parting in this manner, the one *Chryſtallizing* whilſt the *liquor* is hot and boiling and remaining in *great quantities*: the other coagulating into *Sexangular*, not *Cubique* ſhapes, and that when it is *cold* and divided into *Shallow pannes?* Here are *Twenty pages* loſt, that might have been *Expended* in *Luciferous Experiments.*

When the liquor is ſuffered to coole in the Copper, and begins to granulate, *my artiſts* laded it out into the *ſhooting-pannes*, leaving the *turbid* and *faculent* ſetling at the bottom: which (though Mr. *Henſhaw* omit it) they put in again to the *raw liquor*, at any time, as it boiles: and it is their Judgment, that it increaſeth the *Petre* though much of it be *common Salt*; the *liquor* yeilding a ſenſible quantity of *Petre* thereupon more then otherwiſe.

Hiſt. of the R.S. Pag. 272. "When the Liquor is brought to this paſs, every hun-
"dred weight of it containeth about threeſcore and ten
"pound weight of *Petre.* — Any one may Judge how true this is by what I have ſaid before: it may happen that half of it is *common Salt.*

"When you find the Cubique Salt to granulate and
"ſtick to the ſides. —— Why did not he diſgreſs to tell us why it granulates at the *ſides* when it *cooles*, and falls to the *bottom* when *hot*?

"Draw of your Liquor into deep wooden Traies. —— Which if you do, it is ten to one but the weight of the Liquor will break out the *ſides of them*: wherefore our men think it good Husbandry to uſe *Braſs-pannes.*

Hiſt. of the R.S. Pag. 273. "That part of the Liquor which is not coagulated but
"Swims upon the *Petre*, muſt be carefully powred off,
"and being mingled with new liquors, muſt again paſs the
"aſhes, before it be boiled, elſe it will grow ſo greaſy it
"will never generate any Salt. —— This is the *Mother of Salt-Petre*, of which I ſpake before. And if it (or the *raw liquor*, being boiled too long) grow ſo *greaſy*, as not

to

to be able to *coagulate by any meanes*, what muſt we think of his deſigne to counterfeit the *Nitre* of the Ancients?

" Then caſt in by degrees a pint of the ſtrongeſt Wine-
" vinegar, or elſe four ounces of Allom beaten to powder
" (ſome chooſe burt Allom and you ſhall obſerve a black
" Scumme to riſe on the top of the liguor. —— I ſaw as good *Petre* made at *Warwick* as any in the world, without this *cautelous* refining: they caſt in nothing but good *Scowring* water, ſuch as would bear *Soap* well, and continued the pouring of it, as long as any *Scumme* would ariſe. Nor did they lade the *Liquor* out into any *Setling Tub*, (as he propoſeth) but ſuffered it to ſtand in the *Copper* till it began to *Chyſtall* againſt the ſides in ſuch manner as the *common Salt* doth *Chryſtallize* in the firſt boiling: then did they take out the liquor, leaving the *faces* and all that is foule at the bottome. Hiſt. of the R. S. Pag. 273.

Here I muſt take notice of an omiſſion of Mr. *Henſhaw's*, in that having brought his refined *Petre* to *chryſtall* & *rock* in the *pannes*, He then ſlightly transfers it into a Tub with an hole in the bottome to drain, and when it is dry, it is fit for uſe. But I found that our workmen took more care: For they took the large fragments of the *Nitrous rocks* and placed them in *Live-aſhes* upright, and ſo the aſhes did drain from the rocks that greaſy and *Motheriſh* ſubſtance which adheres to the *Petre* extrinſecally as it ſhootes, and which (if not ſeparated this way) vitiates the colour, and takes of ſo much from the Efficacy and goodneſs of the *Petre* as there adheres of *Greaſe*. As for the ſmaller *Chryſtalls* and *pieces*, which are too little to be ſo ranked, they are placed upon a ſheet ſpread upon the ſaid *aſhes*, and ſo that *Motheriſh* humidity draines from them, and they become clear and white as *Snow*. The aſhes being impregnated with this *Oile* are enriched in order to the generating of more *Petre*, when the liquor comes to be paſſed through them.

" The Figure of the Chryſtalls is Sexangular, and if it
" hath rightly ſhot, is fiſtulous and hollow like a Pipe.— Hiſt. of the R. S. Pag. 374.

This discourse concerning the figures of *Nitre Crystallized* proceeds upon the supposition that the Crystalls are of *that shape*, which is a thing I never yet saw, at the making of *Salt-Petre*, nor *Glauber de Signat Sal*: nor I believe Mr. *Henshaw*. The shapes of the *Crystalls* are very *irregular*. I found none *fistulous*: and the Rocks of *Petre* do not seem to be made up of *sexangular* concretions at all. I have seen elsewhere some shaped *sexangularly*, but not *fistulous*, no more did *Glauber*.

He should have done well to have told us, how this *Mixeral* comes to be *thus figured*? and evidenced it unto us that it was performed *Mechanically*: This had been a much more generous undertaking, then the suggestion of an impertinent conceit of his, which I shall speak of presently; He should have shewed the configuration of the *particles*, what it is that gives them *Motion*; what it is that *Sizeth* them, and preserves them *fistulous*: This had been a *curiosity* worthy a *Philosopher*, that understands something more than common *Formes*. To tell us that *nature* acts the *Geometrician*, or that it is done by the agitation of any *subtile Spirits*, or *matter*, acting in a determinate manner upon particles of *one configuration*, whilest the *others* are agitated and *cast off* by a *different Motion*: I say this is no satisfactory discourse, nor very *comprehensible*, when we reflect upon the *Liquor* of the *Salt-Petre* how thick it is *crowded*, and into what *fistulous Crystalls* it coagulates. For all this while, a man does not understand how *Ingenious nature* doth particularly and distinctly *figure* out those *Crystalls*, nor the manner of that *Speciall Geometry* which she practiseth in this case. Should an *Indian* or other Ignorant person, ask concerning the making of a *watch*, or other piece of *Clock-work*, what was the reason that the hand did so *exactly* discriminate the houres; what was the reason of its so slow and equable motion

more did *Glauber*. I observed, and so do the *workmen*, that in the coagulation in the *pans* there is commonly some *protuberant concretions*, which with the Crystalls distinctly composing them have some resemblance of a *rose*, and were so called by our *Artists*. Why did not our *Mechanicies* take notice and Explain that? The Crystalls are the worst *Petre*, and shoot last, they burn as if there were resuscitated *Allom* in them; they make worse powder, and leave more *faces* upon burning; and our workmen will not allow them to be the best sort of *Petre*: whether there be some interceptions of *Aire* and *water* incorporating with the *Nitre* in *shooting*; or whether there be any *resuscitation* of *Allom*, which makes them burn with that *Spumeous Ebullition*, let such consider as magnify Crystalls of *Nitre* in *Physick*; for my part I am satisfied that all *preparations* (how *laborious* and *curious* soever) are not *improvements*. Upon a solution of *Petre* in water, where the Liquor is not impregnated so *high*, as at the *works*, one may see such *Crystalls* as Mr. *Henshaw* speaks of, if he proceeds carefully, and (as my *workmen* say) I have not had leysure to try since the intimation) use *Barbary Petre*, which is that which is usualy sold. But I never visited the *works*, but I thought of a passage some where Mr. *Boyle* hath, that he could never observe such a regularity in the *Crystalls* of *Nitre*, as is spoken of: insomuch as he seems *to doubt* the *assertion*; if my Memory deceive me not. But that sometimes it happens, is certain; and that there are alwaies *beautifull figures* and *complications* about *Micocosme*.

bearing

bearing ſuch an unerring correſpondence with that great revolution of the Sun? and ſhould any man anſwer that it was a peculiar conformation of parts (which conſiſt of ſeveral mettalls) differently ſhaped, and placed in order to the compoſing of that *machine*, which the ingenious *Artiſt* had atchieved: though this anſwer carry much of truth in it, yet doth it not ſolve the *doubt*, or ſatisfie a ſpeculative *inquirer*: Nor if he continue his queſtion further, will he be ſatisfied with a narration that thoſe very materialls are apparently *Sand*, *Lead*, *Steel*, *Iron*, *Braſs*, *&c.* differently agitated according to determinate *rules* of *motion*, whereby it happens that it keeps ſo *certain* and *conſtant* a courſe, in declaring of *Time*. This kind of *general knowledge* may content ſuch as have not leiſure to engage in more *accurate Theories*; but he deſerves not the name of a *Mechanick Philoſopher*, who doth not perſpicuouſly declare the *matter*, and *configuration* of each part, the *Size* and *uſe* of each *wheel*, the effect of each *Spring* and *weight*, and this either *Mathematically* to the underſtanding, or by *ocular demonſtration* to the Eye. This had been an undertaking that would have ennobled Mr. *Henſhaw*, had he gone through with it: and if *he* and *his fellows* deſpair of bringing things to *this perſpicuity*, they had as good ſuffer us to be content, with our old *Formes*, and combinations of *Elements*, with which the world hath ſubſiſted ſo long, and *Mechanicall ingenuity* been ſo farr advanced, that whoſoever is acquainted with the *delicious Luxury* of *Aſia*, *Greece*, and *Rome*, will eaſily think all *our performances*, nay, *pretenſes* not to equall their *reall Enjoyments*; and if there be any *one thing* in the improvement whereof our preſent *Artiſts* (I muſt not ſay *Philoſophers*; the Inventions we boaſt of, being not theirs, but the diſcoveries of more *common and thick Skulls*) Glory, it is overballanced by the multitude of excellent things in which *they* ſurpaſſed *us*.

Mr *Henſhaw* declines all theſe Speculations, to acquaint us with ſome other that he hath of this *Salt*, "Which "if he could clearly make out, would lead us into the "knowledg of many noble ſecrets in nature; as alſo to Ibid.

"a great improvement in the Art of making *Salt-Petre*.— I am ſo great a well-wiſher to the *publick good*, that I ſhall be willing to enquire into any thing, that may advance ſo *great* & *Staple a commodity* as *Salt-Petre* is, and alwaies wil be as long as the uſe of *Guns* continues: and ſince it is the moſt *plauſible pretenſe* for the eſtabliſhment of the *Royall Society*, that they *may* and *will* meliorate and *improve* the *Manufactures* and *trading* of our *Nation*, let us with ſome heedfulneſs obſerve this *publick Eſſay* and tryall of their *Skill* and *Utility*.

Hiſt. of the R. S Page. 275.

"Firſt then you are to obſerve, that though *Petre* go all "away in *Gun-powder* yet if you fulminate it in a *Crucible*, "and burn of the *volatile* part with powder of *Coal*, *Brim-*"*ſtone*, *Antimony* or *Meal*, there will remain a *Salt*, and yet ſo "fixed (very unlike *common-Salt*) that it will endure the "force of almoſt the ſtrongeſt Fire you can give it; which "being diſſolved into water and *Spirit of Nitre* dropped "into it, till it give over hiſſing (which is the ſame with "the *volatile* part that was ſeperated from it in the fulmi-"nation) it will be again reduced to Cryſtalls of *Petre*, as "it was at firſt.

This *Curioſity* was the Invention of that Honourable perſonage Mr. *Robert Boyle*, & a treatiſe writ upon the ſubject, which he was pleaſed to impart unto *me* long before *Glauber* writ any thing of that nature, and I tranſlated it into *Latine*: It hath been made uſe of by Dr. *Willis* as an inſtance whereby to ſhew that *Chymicall* Fires do not generate *new ſubſtances*, but only divide aſunder the firſt *conſtitutive* parts, and exhibit them. *Angelus Sala* did reproduce *Vitriol* out of the parts which he had ſeparated *Chymically*, by remixing them together. But neither do theſe *few inſtances* in the behalf of the *Chymiſts* out of Materialls of a *Slight texture*, ſerve to any other purpoſe then to make us *more doubfull*, not *more intelligent*: For there are ſo many *demonſtrations*, that thoſe *furnaces* do generate *new* ſubſtances & that according to the *different* regimen of the *Fire*, and the *difference* of it, (being *open* or *cloſe*) and the *different Veſſels* and the *different proceſſes*: it being alſo evident that by *other meanes* quite

De fermat. c. 3.

Anatom. Vitrioli tract. 1. c. 10.

quite *discrepant parts* are disclosed, than what those *vexatious Fires* could ever reveal. that I think it impossible for any to submit his Judgment to such *Convictions*: And that the observations which Mr. *Boyle* raised from that Experiment were of such *importance* as Mr. *Henshaw* thinks, is a point which such as measure *speculations* by their *utility*, will hardly grant.

"First you are to observe that though *Petre* go all away "in *Gun-powder*, yet if you fulminate it in a Crucible, and "burn off the volatile part with powder of Coal.—— "There will remain a *Salt*, and yet so "fixed, that it will endure the force "of almost the strongest fire &c.—— This same to me doth not seem so extraordinary *aphænomenon*, so as to merit an *unusuall* regard: for that *Gold* is as *fixed* a body as this *Salt*, is undeniable; and yet in the deflagration of *Aurum fulminans*, its particles *flye away*, though they may be catched under the forme of a *purple powder*, if the fulmination be performed in a close Vessell, as Dr. *Willis* observes, *De fermentat. c.* 10. so in *Salt Armoniac*,, the common *Salt* will undergo many *sublimations*, without deserting the *concrete*: and yet it is an easy thing to reduce it to such a state of *fixedness* as amazeth our *Virtuoso*. Many other instances might be alledged: and therefore I proceed to tell the world, that though Mr. *Henshaw* entitle Mr. *Boyle* to this *Noble Experiment*, yet what he repeats of it, is taken from *Glauber* out of a book of his printed in 1659. *de signaturâ Salium* &c.—— *pag.* 28. whom yet *he* names not. This is manifest from this that Mr. *Boyle* useth *live pieces of coal* to calcine the *Nitre* with: *Glauber* in his *Pharmacop: Spagyric. part.* 2. *p.* 28 & Mr. *Henshaw* cast in the *powder of coal*. Mr. *Boyle* Speaks nothing of calcining it with *Brimstone*, or *Antimony*, which *Glauber* doth: and so doth Dr. *Willis*: But the former prescribes the *Regulus Antimonij Stellatus* Concerning the Experiment as it is performed with *coale*, I have this Scruple; That I am not satisfied by any observations

Mr. *Sprat ubi supra*,

In this reproduction of *Petre*, it is observable which *Glauber* suggests: viz. that though the *acid* and *alcalisate Salts* mortify *Each* other presently; *non tamen e vestigio sit Sal Hermaphroditicus, sed necesse est ut aliquamdiu in aere collocati vitam et naturam ardentem quâdignis ipsos nudavit, recipiant. Hæc illis inicamus qui sales sine atris opera, animari posse forsan opinarentur. Prosp. Germ. par.* 1 *Pag.* 101.

De Ferment. c. 10.

I can make, that *Salt-Petre*, if it be rightly *purified*, will upon *deflagration* leave any *such Salt* behind it at all. But that whereſoever any ſuch thing remaines, it is the product of a *common Salt*, and other *heterogeneous* mixtures incorporated with the *Petre*: I am moved to this doubt, by the ſaying of *Scaliger* concerning the beſt-ſort of *Nitre* which he terms *Sal-Petræ*: viz. *Tam enim Sal quam Nitrum ita uritur, ut cineris quippiam relinquatur: Sal-Petræ univerſum abſumitur ab igni.* And in the tryalls of *Salt-Petre* which are made by the beſt Artiſts *Pietro Sardi* & *Caſimirus Semienowicz*, it is required of good *Salt-Petre*, that it burn *all away* upon the Table, leaving no *impurity* or *fæculency* behind. I have taken of the beſt *Salt-Petre* at *Warwick* oftentimes to make this Eſſay, and alſo to compare the *Cryſtalls*, and *White-rock-nitre*: I put the pieces upon a broad *Pit-coal* red-hot, and could ſee a *difference* in the burning of *Each*; and a *different* quantity of that *incombuſtible* matter remain according to the different purifications; inſomuch that as fart as my Eye could guide my Judgment, out of an *ounce* of the beſt *Rock-Petre* there could not remain *half a dram* if a *ſcruple* of that *fixed Salt* which Mr. *Henſhaw* ſpeaks of. In the *Crucible* indeed upon burning with *coal* there did remain about a *third part*, when I burnd the beſt *Petre*: and more, according as it is more *impure*. * Dr. *Jorden* obſerves that the difference betwixt *Salt-Petre* and the *Ancient Nitre*, appears in this, that a pound of *Nitre* being *burn'd*, will leave four ounces of Aſhes; *Salt-Petre* wil leave *None*. † And the common aſſertion of our *Engliſh* Gunners about the *Goodneſs* of *Petre*, is; If it be laid on a board, and a coal put to it, and it burne into the board, and leave *nothing* but a black colour, and riſe with a long flamed ventoſity and exhalation, it is well refin'd. But ſince the obſervations of *Scaliger*, & thoſe other *Artiſts* of unqueſtionable credit, and my own *Experience* teach me that the quantity

De ſubtil. exercit. 204. 15.

See the proof of this in the account of *Pietro Sardi* which followes.

If the coal be not broad the *Petre* as it burns will run over it.

Mr. *Thibaut* in his Art of Chymiſtry obſerves, that a ſpoonfull of *Nitre* caſt into a pot red-hot, will preſently be in a flame and vaniſh *all* away in Smoak Pag. 58. See him alſo Pag. 53. Where he prepares *Salt of Tartar*. So *Glauber*. *Nitrum prunæ ardenti impoſitum totum conflagrat et in auras Evaneſcit. Pharmac. Spag, p.* 2. *p.* 95.

* Dr. *Ed: Jorden* of naturall Bathes. *c.* 7. pag. 35. *edit. in* 40.

† *Jo: Roberts* in his compleat Canonier, pag. 49.

tity of what remaines after the deflagration of *Nitre* depends upon its *impure* and *Saline mixtures*, and that pure *Nitre* burnt *openly* leaves *nothing* behind it; I am apt to believe that either there is something in the nature of the *Crucible*, or in the manner of burning *it* in those Vessells, that causeth that *Phænomenon*. And perhaps there is not so much of untruth (*upon this ground*) in that saying of *Bequinus*, that *he that operates well shall draw a pound of Spirit from a pound of Nitre*.

Mr. *Thibaut* saith that in a *Crucible* it consumes almost quite away. pag. 34.

Tyrocin. Chym. l. 2. c. 4.

But let us suppose that there doth remain, otherwise than by *accident*, this *fixed Salt*, our *Philosopher* saith *it is very unlike common Salt*. *A doughty remarque!* It is very like any *Alcali*; if it be not *common Salt* reduced to an *Alcali*: though the mixtures of *Allom* and *Vitriol* may give it a little *diversification* sometimes. But where is the *improvement* he promised us all this while of *Manufacture* of *Salt-Petre*? Why it amounts to this: Take a pound of the best purified *Nitre* that you can buy, such as is already fit to make *Gun-powder*, distill it with three, four or five times as much potters Earth prepared in a Glass retort well luted in a close reverberatory furnace; giving fire by degrees till you come to the highest, which continue twenty four houres. Out of one pound of *Nitre* thus distilled, you may have *four ounces of Spirit* saith Mr. * *Thibaut*. But Mr. † *Hartman* upon *Crollius*, saith there will come out of those *red Spirits*, but *an ounce and an half* or *two ounces* at most. Having gained this *Spirit*, let him take a pound more of as good *Petre* and burn it with a *Coal* in a *Crucible* according to the process of Mr. *Boyle*, or *Glauber*: and let him get as much *fixed Salt as he can*: breaking his *Crucible* into the bargain. I find that Mr. *Boyle* in his account of the redintegration of *Nitre* saith not what quantity of *fixed Salt* he had: only that he reproduced the *Petre* by pouring the *Spirit* upon the *Alcali*; and that he did not affuse *so much* of *Spirit* upon *it*, as the *Alcali* seemed to have lost in the *burning*: and yet *not much less*. In another place about *subordinate formes* pag. 350 he saith that *Nitre* upon calcination leaves only a *third part*, or *perhaps more*. But let him get *what he can* (I assure him that the fowler his

* Art of Chymistry. pag. 33.

† De Spirit. Sal. Nitri pag. 133.

See Mr. *Boyle's* Experiment About the parts of *Nitre* Sect. 4.

Petre is, the more he will get) and having dissolved it in *raine-water*, and filtrated it, let him powre upon it the *Spirit of Nitre* drop by drop untill the abullition cease: Then let him with patience expect for some daies, the redintegration of the *Nitre*: or if he be hasty, let him evaporate the liquor away till it come to a *cuticle*, then place it in a cool place, and in one night he shall find his *Petre* to *Crystallize*: Then powre off the *liquor*, and evaporate it to a *Cuticle* again, and so a third time till he have gotten all the *Petre*. Having allowed this *Experiment* all the advantages imaginable, which is, that our *Operatour* shall have such a quantity of *fixed Salt* as will *redintegrate exactly his Petre* (which may *not happen*: as I have demonstrated) so that having *calcined one pound*, and *distilled another into Spirit* he hath *reproduced* now one *compleat pound of Petre*: And that this *Petre* is as effectuall for *Gunpowder*, as our *common Salt-Petre*; (which yet is an *Experiment* our *Inventors* and *Improvers* give no account of: Mr, *Boyle* saith his was *more acid*, then *Salt-Petre* is usually; and what alteration that *Superfluous Spirit* adhering is to the Crystalls may produce, I know not. *Glauber* proceeds to *dissolve again and filtrate* his regenerate *Nitre*; and then saith *Quicquid post operationem Superfuerit in arenâ per evaporationem, donec cuticula appareat, rursus distillandum, et in frigore in Crystallos redigendum est, quæ*, ut vulgaris Sal-Petræ *in usum adhiberi possunt*. And saith that if you will again *calcine one part*, and *distill another*, and *reproduce Petre*, you shall have more pure *Petre* than ever, and which will perform admirable effects in *Physick and Alchymistry*.) Granting, I say, our *Operator* all this happiness, I desire to know where is the *great improvement in the Art of making Salt-Petre*? How much *Cheaper* will this be *afforded*, then that which is *usually sold*? How much more *Effectuall* will the *powder* be which is to be made out of it? Will a *Thimble-full* serve to charge a *Culverin*? Or, if there be requisite as much to the *charge* as of *common powder*, will the *force* be such that Each *Bullet* of a *Culverin*, or *Canon* shall do execution at the *Texel*, *Algiers* or *Candia*? Can you dispatch with a *pocket-pistoll* from *Arundell house* the boldest *pyrate* within

Glauber de sig. nat. Sal. p. 28. 29.

ubi supra Sect. 17.

De signat. Sal. ubi supra.

within the *Straights*? Or, in fine, will this *Powder* laſt *for ever* without any *decay*, and by its *durableneſs* countervaile the charge and Extraordinary trouble in the making? I cannot find a word of *all this*; nor any thing but what will convince any man that to make *Salt-Petre*, is but to *looſe his time* inſtead of *improving the Manufacture*. I heard that *Some of the Society* had a great mind to work *Silk* into *Hats*: which project though the *Hatters* laughed at, yet to ſatisfie *them*, tryall was made: and for *twenty ſhillings* they had a *Hat* made, but it proved ſo bad, that any one might have bought a *better* for *Eighteen pence*. I ſhall do Mr. *Henſhaw* a courteſy, and tell people (beſides the pretty curioſities obſerved by Mr. *Boyle*) that with all this *trouble*, and *coſt*, though they got never the better *Petre*, yet *Glauber* tells you, this is the only way for any man to ſee the true *ſignature* and *rightly-ſhaped cryſtalls of Nitre*: they will be all as white as Snow, long, ſlender, *Sexangular*, and ſo ſmooth that nothing can ſeeme more poliſhed, and ſo diſcover that *ſignature* which God and Nature endowed *Salt-Petre* with. *Si rectè operatus fueris, omnes Cryſtalli nullis exceptis erunt in longitudinem æqualem directæ, et Sexangulæ ſine ullâ aſperitate et Scabritie, quæ vera et genuina Salispetræ rectè et probè purgati Signatura exiſtit.* And is not this a conſiderable *improvement in the Art of making Salt-Petre*, to produce ſuch *beautifull Cryſtalls*, to ſhew the true *figure* into which that *Salt* naturally doth *Cryſtallize*? Some have repreſented the *naturall figure* of that *Salt* to be *Cylindricall*: and I have by me ſome *exact* and *large Cylinders* into which it did *Cryſtallize*, but not from the *Salt-Petre works*: ſome have aſcribed to it other ſhapes; Mr. *Boyle* found it to be *Sexangular*, but the *ſides* not of equall breadth, and, each two whereof as they were oppoſite to each other, ſeemed paralell. *Glauber* ſaith that their ſhape will be ſuch as I have deſcribed in *Engliſh* above, if you follow *his way* in making them. And is not this a *notable diſcovery* for ſuch men as raiſe their Glory upon the *ſhewing of Sights*! Eſpecially, if Mr. *Henſhaw* Exhibit them alſo *fiſtulous*! which neither *Glauber* nor Mr. *Boyle* did!

de ſignat. Sal. Pag. 29. 30.

Experiment of *Nitre Sect.* 5.

The other way of burning *Salt-Petre* to an *Alcali* with *Brimſtone* is ridiculous, and ſuch as any man that ever made *Sal prunellæ* will laugh at. For the *Brimſtone* doth not burn the *Nitre* to any *Alcaly* at all, nor inflames it at all, but ſerves to purifie it by conſuming the *Sal-Armoniacall* parts or *greaſy heterogeneities*, and precipitating its *fæces* to the bottom of the pot till it become ſo tranſparent, that after thoſe projections, and flagrations you may ſee the bottom of the pot through the melted *Nitre*. And this is ſo evident a thing that *Senertus* and Monſieur *Thibaut* are poſitive therein. *Pietro Sardi* (as you may ſee hereafter) and *Caſimirus Semienowicz* in his *Ars mag. Artiller. p. 1. l. 2. c. 3.* do preſcribe this very way of burning it with *Sulphur*, inſtead of the more tedious *reſining* which is uſually practiſed, in order to the making of *Gun-powder*. "*Imponatur Sal-nitri in* "*vas aliquod cupreum vel ferreum, aut fictile vitreatum, et* "*igne vaſi ſuppoſito, perá, ſolitos gradus auctо exuratur, donec* "*Sal liquefiat et fervendo bulliat. Iam ſumatur aliquantu-* "*lum Sulphuris communis ſubtiliſſimè pulveriſati, et Salinitri* "*liquefacto ſuperinſpergatur: et concipiet ſubitò flammam, et quic-* "*quid pinguedinis vel noxij terreſtris Salis non ſufficienter pur-* "*gatus Sal-Nitri habuerit, exuret et multum clarificabit: in-* "*jectio autem Sulphuris aliquoties reiterari poterit. Deniq, li-* "*quefactum et purificatum Salemmitri Effundito in marmor poli-* "*tum vel laminas ferreas aut cupreas, vel vaſcula aliqua* "*metallica vel ſigulnea vitreata, et frigeſcere ibidem ſinito. Ha-* "*bebis jam Salemnitri congelatum, Parium lapidem vel Alaba-* "*ſtritem colore et duritie quàm proximè referentem.* If that excellent *Lithuanian* found this to be as good a way to *reſine* the *Nitre*, as that other by new ſolution, affuſion of *Lixiviated* liquors, and new coagulation: If it be evident that *Sal prunellæ* will *Cryſtalize*, and *burn* as other *Petre*: if it be certain that *Brimſtone* cannot burn *Salt-Petre* (as *Senertus*, *Tartaglia* and *Semienowicz* avow) How ſhall we do for this *fixed Salt* or *Alcali* wherewith to make *Nitre* by affuſion of the *Spirit*?

Senert. de conſ. Cyn. c. 19. Mr. Thibaut *Pag.* 59.

His calcining of it with *Antimony* hath as little of ſence as the former: for beſides that there is more trouble in the proceſs

proceſs, becauſe that the *Alcaliſate Salt* muſt be waſhed from the *Antimony*: which takes off from the *improvement*. If there be any *Alcali* in thoſe preparations of *Diaphoretick Antimony* (wherein every Apothecary tries the Experiment) it is from the *common* or other *Salts* mixed with the *Nitre*, and not from the *Nitre*, part of which flies away with the *Sulphur* of *Antimony* as it *deflagrates*: the reſt ſtaies behind, and may be extracted with water, and *reduced* into *Cryſtalls* of *Nitre*, as a friend of mine tried, of which he keeps ſome by him. This *Schroder* and *Rolfincius* ſpeaking of *Diaphoretick Antimony*, and its edulcoration confeſs, "*Aqua poſt primam* "*edulcorationem nitro gravida ad medietatem evaporata præbet* "*egregiam Aquam Anodynam. Eâdem juſtâ evaporatione pragreſſâ* "*in cellâ ſubterraneâ locata concreſcit in Cryſtallos, qui Nitrum* "*Anodinum vocatur. A Schrodero* LAPIS PRUNEL- "LÆ ANTIMONIALIS *indigitatur*.

Ralfinc. Clym. in art. red act. l. 5. Sect. 7. c. 2. pag. 377.

The *vanity* of *Some men* not knowing when they are *well* muſt be trying *new concluſions* although it be for the *worſe*: and obtruding *them* upon others. What (if at all,) was to be done with plain *coal*, muſt for *Oſtentation-ſake*, be tryed with *Brimſtone* and *Antimony*. And it had been a more genuine obſervation to have acquainted the world how; after Mr. *Boyl* had found out a way to reproduce *Nitre* by affuſing the *Spirit* to the *Alcali* of *Nitre* burnt with *coal*: Mr. *Henſhaw* had found out a method how to reduce the *Alcali* of *Nitre* burnt with *Brimſtone* and *Antimony* to *Nitre* without any new *Spirit* affuſed. Had he pretended this, it had been but an *ingenious impoſture* for vulgar capacities: but now there is more of *weakneſs* than of *knavery* in the *performance*.

Had he told us out of Mr. *Boyle's* Eſſay, and eſpecially out of *Glauber*, that the manufacture of *Salt-Petre* might be *improved* by affunding *Aqua Fortis* or the *Spirit of Nitre* upon the ſolution of *Pot-aſhes*, or any *Alcaliſate-Salt*; Nay upon *Sal Gemmæ*, *Bay Salt*, common table Salt, or *Lyme water*, and that thereby any one might gaine *Cryſtalls* of *Nitre*, proceeding according to *Glauber*. *Proſper: German. part. 2. pag. 66. Et habebis purum putum Salempetræ, inſtar alius Salis-*

Petræ ex pecorum aut pecudum Stabulis petiti, flammam concipientem. If he had hold us this, though the advantage would have been greater than by the *Alcali* of *Nitre*; yet would it not have been considerable, because of the *expense* and *Trouble*, and that it must be performed with the *brittle* materialls of *Glasses*, as *Glauber* observes. But it would have illustrated a little what I mentioned about the *Lixiviate Salt* in the Ashes through which the *Salt-Petre-liquor* is filtrated, shewing how the *Alcali* and *common Salt* are turned into *Petre* by vertue of that *Liquor*, which yet hath nothing of the *Acid Spirit*, whereby the *Chymists* generate theirs. Let us learn from thence how obscure the procedures of Nature are! and how different from those of *Art!* And let us leave off to say, that things are alwaies *generated* of those *principles* into which they are *Analised*.

Ibid *pag.* 67.

"That which I aim at then is, that if the *Spirit of the volatile Salt of Soot*, or of the *Urine*, *blood*, *hooves*, *hair*, *excrements* or indeed any part of *Animals* (for all abound with such a *volatile Salt fixed* and *Oile*, as *Petre* doth) could by the *same way*, or any like it, be reduced to *Petre* or some *Nitrous Salt*, not much differing it from it: it would excellently make out a *Theory* that I am much delighted with *till I am convinced in it*; which is, that the *Salt* which is found in *vegetables* and *Animals*, is but the *Nitre* which is so universally diffused through all the *Elements* (and must therefore make a *chief ingredient* in their *nutriment*, and by consequence of their *Generation*) a *little altered from its first complexion*. And that the reason why *Animals* that feed on *Vegetables* are obliged by nature, to *longer meales*, than those that feed on other *Animals*; is, because *Animals* are fuller of that *Salt* then *Vegetables*: And indeed such *Animals* are but *Caterers* of it for Man; and others whom natures bounty gratifies with a more *delicious* and *lusty Dyet*.

Hist. of the R. S. Pag. 275. 276.

"I confess I have been the more confirmed in this *fancy*, since I have often seen a friend of mine with a natural and facile Ἔξοδια convert the greater part of *Petre* into a

Salt

"*Salt* ſo like the *volatile Salt of Urine*, that they are ſcarcely "to be diſtinguiſht in ſmell or taſt; and yet he adds no-"thing to it that can poſſibly be ſuſpected to participate of "that nature. But indeed all *volatile Salts* are ſo *alike*, that "it is not eaſy to diſtinguiſh them in any reſpect.

I have been carefull not to diſmember this laſt *Paragraph*, that the *Reader* might with one view ſurvey this *ſtrange fancy*: and Judge better how little I impoſe upon him in the ſequell of my diſcourſe.

And firſt I ask our *Orator*—how he applies this *Speculation* to what he promiſed us in the introduction to it? *How does this improve the Art of making Salt-Petre?* If an *ill Memory*, and a proportionate *mixture of ſomething elſe*, be demonſtrations of a *great Witt*, no man hath given greater teſtimonies of *his abilities* than Mr. *Henſhaw*. Secondly, I demand why *He* is ſo Solicitous *to transform the Spirit of the volatile Salt of Soot* or *Urine* &c *into Petre*: whereas any man that conſidered what he went about would employ his care rather to coagulate the *volatile Salt with which the Spirit of Soot and Urine abounds* with *Spirit of Nitre*, *Aqua-fortis* or the like into *Petre*; or ſome ſuch *Nitrous Salt*? But, behold the *Happineſs* of Mr. *Henſhawe's* Fanſy and the *unhappineſs* of his *judgment*: That which he Fanſied poſſible about the coagulation of the *volatile Salt* abounding in Spirit of *Urine* with *Spirit* of *Nitre* into a kind of *Petre*, this Experiment hath happily ſucceeded under the tryall of the Honourable and inquiſitive Mr. *Boyle*: but yet that *Theory* which he goes about to deduce thence is as farr from being eſtabliſhed thereby, as the Artifice of *Salt Petre-making is* from being thereby *advanced! From Spirit of Urine* (ſaith Mr. *R. B.*) *and Spirit of Nitre, when I have ſuffered them to remain long together before coagulation, and freed the mixture from the Superfluous moiſture very ſlowly, I have ſometimes obtained fine long Cryſtalls, ſo ſhaped, that moſt beholders took them for Cryſtalls of Salt-Petre.* But whoſoever ſhal conſider how much more *trouble* and *coſt* there is in diſtilling thoſe other *volatile Spirits* than there is in the drawing of the *Spirit of Nitre*: and how *ſmall quantities* are like to be made this way,

Mr. *R. B. Origine of formes* Pag. 125.

and thoſe perhaps not ſerviceable in *Gun-powder*, will eaſily ſee that this project is as *inutile* as the former was in order to the *improvement of the making Salt-Petre.*

Oh! But *it will excellently make out a Theory, that the Salt which is found in vegetables and Animals, is but the Nitre which is ſo univerſally diffuſed through all the Elements, a little altered from its firſt complexion.* I remember that *Scaliger* taking occaſion to complain of *Cardan* for ſome *illogicall* inferences, uſeth theſe words: *Dij benefecerunt, quòd te fæminam non fecerunt. Ad primam quamq; ſpeciem promiſſorum exiluiſſes.* I muſt apply this *Sarcaſme* to Mr. *Henſhaw*, who could be deluded by ſuch weak appearances of *reaſon.* Let us but ſhape an *Hypotheticall Syllogiſme* for him, and conſider the conſequence.

De ſubtil. Exerc. 153 Sect. 9.

If the Spirit of Nitre *being poured upon the* Spirit of the Volatile Salt of Urine, Soot &c. *doth reduce the Volatile Salt to* Petre *or ſome* Nitrous Salt *not much differing from it; then doth it follow that the* Salt *which is found in* Vegetables *and* Animalls, *is but the* Nitre, *which is ſo univerſally diffuſed through all Elements* (*and muſt therefore make a chiefe ingredient in their nutrition and generation*) *a* little altered *from its firſt complexion. But the* Antecedent *is true* Ergo,

In the firſt place it is evident by the Experiment of Mr. *Boyle*, that even *Sea-Salt* by the affuſion of *Spirit of Nitre* may be turned into *Petre.* Nay *Glauber* teacheth us how *Allom, Vitriol, Mineralls* and *Stones* may be with more or leſs trouble converted into *Nitre*; why did not he extend his conſideration about the *Nitre in all the Elements*, to them? Is it becauſe that they abound not in *Oile* and *volatile Salt*, upon which he *ſo wiſely* builds his *Argument?*

Origine of Formes Pag. 216.

Secondly, ſince it is made evident by *Glauber* in many places of his works, that the *Spirit* of *Nitre* is as it were the *Seed* of *Nitre* by which it propagates it ſelf and aſſumes a body, as plants do, where it finds one agreeable: and ſuch are not

In Append. ad quint. part. Proſper. Germ. Pag. 20. 23, 25, 49. &c.

only

only (nay not *principally* : which he ſhould have noted) the votatile but fixed Salts of any Creature? *Aqua fortis, aut Spiritus Nitri, eſt quaſi Semen Salis-Petræ, atq; hanc naturam habet, quando alijs Salibus, ſicut ſemen aliquod vegetabile terræ, mandatur, ut ex ipſis augmentum capiendo, multiplicetur, quemadmodum herbarum ſemina faciunt.* This *Seminall principle* in *Nitre* ſeemes to have the approbation of Mr. *Boyle*: and if it be thus, as undoubtedly it is, and that thoſe *Salts* (whither *volatile* or *fixed*) are but the *materiall* principle, I do not ſee any more validity in the conſequence, than if I ſhould ſay, becauſe ſundry *plants* grow in the *Earth* or *Water*, therefore the *Earth* or *Water* were but thoſe plants *a little diſguiſed in their complexion.* *Chymiſta Scepticus, p. 240.*

In fine, it is ſo farr from following hereupon, that *Salt-Petre diſguiſed is the Chief ingredient of the nutrition and generation of Animals*; that it doth not follow, that *it is any ingredient at all*; but that there is ſomething in thoſe ſubſtances mentioned that may be converted into *Petre*, and is, as an *Ariſtotelian* would ſay, diſpoſed fitly to be the *Subject matter* of that *Forme*. For as this *Argument* is *ſhaped*, what I ſay is as manifeſt, as that the *conſtitutive parts* of the *Nitre*, are to be the *volatile Salt* & the *Spirit of Nitre*: The one thing *indifferent* to ſundry *combinations* and *tranſmutations*, and which hath nothing of the nature of *Salt-Petre*; but is palpably tranſmuted; ſince in the diſtillation of good *Nitre* there appears no ſuch thing as *volatile Salt*: The other it is, that *Specifiates* the *prediſpoſed matter*, and generates *Petre* out of it; ſo much altering the *complexion*, that the *affinity* betwixt that volatile *Salt* and *Salt-Petre* is no more than betwixt a *man* and a *pumpion*. He talks of the complexion of the *Nitre* being a *little altered*: but I would faine know *how little that is*. Let me ſee the like Cryſtalls: *a reſembling flame*, and other effects that reſult from the *being* and *Specification* of *Salt-Petre*. If *Salt-petre* be a *chief ingredient in the generation and nutrition of vegetables*, Tis either becauſe of its *bulke* or *Efficacy* that it is *chief*; but neither of theſe is true: For the *quantity* is not ſo great in *vegetables* or *Animalls*, ſhould we allow the *volatile Salt* and *Nitre* to be *all*

one. Not for *Efficacy*, becauſe it is not made out that there is *Nitre* in the *Sea*, in *clay-grounds* or *Springs*, or in *Countries remote from the Sun*, yet here *fiſhes* and other *Creatures* feed, and *plants* grow: and conſequently that cannot be a *chief ingredient in nutrition*, which may be wanting.

There is ſomething elſe in Mr *Henſhaw* that lookes like an Argument by the introduction *FOR.* —— *For all abound with ſuch a volatile Salt fixed, and Oil, as Petre doth.* I cannot tell how to forme this Argument, and yet convince the world that I do not injure him, this paſſage is ſo extreamly *ridiculous.* Yet I will endeavour it, if it be but to ſhew the *Logick* of *Ant'-Ariſtotelians*, and how much we owe to that *providence* which hath *educated* us better than to argue ſo. The propoſition he *aimes at*, and would prove is, *That the Salt which is in vegetables, and Animals, is but the Nitre which is univerſally diffuſed through the Elements.* The *medium* or Argument by which he would prove it is —— is —— is —— harder to be *found out* than the meaning of *Ariſtotle* in his *Acromaticks.* Let us conſider it again.

"That which I aim at then is, That if the Spirit of the "volatile Salt of Soot, or of the Urin, blood, hornes, hooſes, "haire, excrements, or indeed any part of Animals (for "all abound with ſuch a volatile Salt fixed, and Oile as "*Petre* doth) could by the ſame way (viz: as the redinte-"grated *Nitre*) be reduced to *Petre*, or ſome *Nitrous* Salt, "it would Excellently make out a *Theory* that I am much "delighted with, till I am convinced in it: which is, that "the Salt which is found in vegetables and Animals, is but "the *Nitre* which is ſo univerſally diffuſed through all the "Elements (and muſt therefore make a chief ingredient in "their nutrition, and by conſequence of their generation) "a little altered from its firſt complexion.

By his Favour there is no conſequence in that paſſage: if it be the *chief ingredient in nutrition*, 'tis ſo *in generation*: for though *nutrition* be *commonly* by a new *generation* of parts: yet in that which is properly generation; the *Seminall principles* and *active* are *chief* in *nutrition*; the *materiall* and *paſſive* principles are more regarded.

Here is the *Spirit of the volatile Salt* of the parts of *vegetables* and *Animals*, to be coagulated and transformed into *Petre* by the Spirit of *Nitre.* —— Here is a *volatile Salt fixed*, and *Oile* ſuch as is in *Petre!* mentioned to what

purpoſe

purpoſe! —— Here is a *Salt* ſpoken of to be found in *Vegetables*, and *Animals*: yet 'tis not expreſſed whether it be the *volatile* or *fixed Salt*: yet theſe *two* are different, and thoſe that abound with *volatile Salt* are more the *Phyſick*, than the *food* of man. —— Well I have ſpent half an hour to frame a *Sorites*, or any *tolerable Argument* out of *theſe words*: but I cannot do it: but I will adventure to give *our Philoſophers* this adviſe that they would take our *Engliſh* word *FOR* into their ſerious conſideration, and *aboliſh the uſe of it*, as the *French* Academy at *Paris* did *Car*. Before I have done with this *Hiſtory*, I ſhall ſhew that this *Intimation* was but *neceſſary* for *them*.

To proceed: How doth it appear that *Salt-Petre* abounds with a *volatile Salt fixed* and *Oile*? In the regenerated *Nitre* (which *Glauber* makes to be the beſt) there is nothing but *Alcali* and the *Spirit of Nitre*: in the *Nitre* which is generated by the mixture of the *Spirit* of *Urin* and *Spirit of Nitre* there is no ſuch thing. In the *diſtillation* of *Nitre* there is nothing but *Spirit* (inſeperate from *Phlegme*) and its *Alcali*: and as there is no *Oile* there, ſo I hope he would not have us take the *Alcali* for a *volatile Salt fixed*. In the making of *Salt-Petre* there is found indeed ſomething that ſeems *Oily* and *Greaſy*: but that is *Excrementitious*, and ſo farr from being a *conſtitutive part* of *it*, that it muſt be *Separated* from *it* (as Mr. *Henſhaw* knowes) before *Salt-Petre* can be made: and the great contrivance is *how to ſeparate it*. So *Glauber* in *Proſper German. part.* 3. *pag.* 43. *alias enim pinguedinem nimiam contrahit lixivium, nec ullum Sal generabitur.*

From the mention of this *Oile*, I muſt take an occaſion to tell the world how ſuperficially our *Virtuoſo* writes the *Hiſtory of Nitre*: I could ſuggeſt many *curioſities* from the *ſeverall liquors* in the making of *Salt-Petre*: But I have not time to diſcourſe of the *Mothers of Petre*, nor how that *greaſe* being lodged in the *aſhes*, thoſe *aſhes* being expoſed to the Sun at *Warwick* did in one or two daies produce viſible *Nitre* on the top of the *aſhes*, ſo that in few daies thoſe *aſhes* become fit to be *Elixiviated* into *raw liquors*, which were before but to make a *Lixivium* to

purge the *liquors* that had boiled. I ſhall only touch at an Experiment which may not be unwelcome to the Honourable Mr. *Boyle*. I took of the *Mothers* that had ſtood long and were exceeding *Oily* : I powred four ſpoonfulls of them into a large *Venice-glaſs*, half full of water : This *greaſy liquor* ſunke to the bottom *inſtantly* without altering the *taſt* or *colour* of the *water* at all : ſo that the top was *clear water* ; the bottom of a *reddiſh colour* as *bilious Urin* : only on the ſurface of the water, and in the middle, there did flote ſeveral very ſmall *bubbles* of the *colour* of *water*: having let this ſtand a day : I took a Solution of the *Alcali* of *Salt-Petre* (which, though of a *greeniſh blew*, yeilded a *lympid liquor* upon *filtration*) and poured two or three ſpoonfulls into the mixture of *Mothers* and *water* : immediately the whole liquor turn'd *Lacteous* or *White* ; but the colour *preſently* contracted it ſelf into a white *evæorema*, or *ſuſpenſum*, ſuch as is to be ſeen in *healthfull Urin*, and ſo floted above the ſurface of the *Mothers* : the next morning I found as it were a *powder* fallen to the *bottom*, which I ſtirred up to the top, whereupon the whole *liquor* up to the *top* of the water was *turbid*. * I let it ſtand all night, and this morning the whole *liquor* from *top to bottom* is of one *colour*; and that exactly of a *Limon-colour*, or like old *Hoccomar-wine* ; on the top there ſeems to float thin *coagulations* of *fat* with ſome variety of *colours*, ſuch as one may often ſee on *ſmall waters* that ſtand in *Mooriſh* grounds : the liquor is nothing nigh ſo *acrimonious* and *purigent* as the *Mothers* were: and *all of it is* as *greaſy* as the *Mothers* were, when *Separate*: hanging on the finger, as *Oile*, and not like *water* at all ; at the bottom of the Glaſs there lies a *Yellow ſediment* as 'twere *powder*, which upon *agitation* will not riſe of it ſelf, but muſt be ſtirred up with ſomething, and

* After the *Glaſs* had ſtood ſome daies, the liquor loſt its *Oilineſs*, no *Cryſtalls* did ſhoot at all, but it became a litile *turbid*, on the top there floted ſomething here and there, like to a thin *cremor*, and on every ſide of the Glaſs from the top to the bottom thereof fixed themſelves certain *moleculæ* which a credulous *Chymiſt* would as firmly have believed to have been the *rudiments of ſome plants*, as that the *Salt* of *Harts-hornes* in diſtillation repreſents the *hornes of Stages*; If you will imagine any Plant growing on the ſide of a *wall*, and that inſtead of the leaves of the *plant*, there were nothing but white *filaments iſſuing from a root*, ſuch were theſe : all of them were of one *bigneſs*, and were ranked in *ſome order*. A chance hindred me from making further *inquiries* : nor indeed am I much ſollicitous about them.

The *Phænomenon* appears not if you look *downe right* on it, bût ſtanding on one ſide at a diſtance.

and then resembles the white *Hypostasis* of *Urin*, with *capillary filaments* enterveaving each other.

And, How doth it appear that *Urin* doth abound with *a volatile Salt fixed*, and *Oile*? *I* do not understand what he meanes by his *volatile Salt fixed*: by what is it *fixed*? to *what degree*? *volatile Salts* are sometimes so *fixed*, as only to *abate*, not alter the *volatility*: *as the volatile Salt* of *vipers*, in *Zwelfer*: and the *volatile Salt* of *Harts-horn* (of which *I* keep some) with rectified *Spirit of Salt*: Sometimes *they* are so *fixed* as to loose the nature of *Salt* and to become *insipid*, and *indissoluble*: as when *volatile Salts* are mixed with *Lime-water*: There are a sort of *Salts* which *Zwelfer* calls *Salia Essentialia*, which are not to be called properly *fixed*, nor *volatile*, being *mediæ quasi naturæ inter utraq; Salia*, volatilia *scilicet*, (*quæ instar* Spirituum *levi ignis calore concitata sublime petunt*) *et* fixa. *Zwelfer. in Pharmacop: Aug: pag. 486. Edit. in 8.* *Ibid. pag. 234.*

And there are *Salts* so *fixed* naturally that they will endure the *Fire* without evaporating: such are *Alcalisate Salts*, being *purely Salt fixed*: other *fixed Salts* having of *acidity* in them, and upon *distillation* yeild an *acid Spirit*: how farr these may be *volatilised*, is not the question; but whether there be in *Urin a volatile Salt fixed*: which any man will deny, who considers with how much ease the *volatile Salt of Urin* is procured. As for the *Oile* wherewith *Urin* is said to abound, surely Mr *Henshaw* converses with *men of a strange kidney* that make *such water*; Or that feed much upon green *Tortoyses*. *In some morbid* persons Physicians Speak of *Urines* that are *oleaginous*, ἐλαιόχροα, ἐλαιοφόρα, ἐλαιώδη. But *I* shall favour the *Virtuoso* so much as to understand what he saies about *Urin*, as relating to persons *in health*, and not *sick*; least *I* should be to seek as much for the *volatile Salt* as *I* am for the *Oile*, which is not to be distilled from it by any *Chymicall* process, that I meet with in Dr. *Willis*, or any else: nor to be seen, but in such as feed on *green Turtle* in the West *Indies*: or *are not well in their bodies*: not be *spoken* of, but by such as are *not well in their Wits*. If by *Oile* he means that which gives a colour to the *Urin*, and is by Dr. *Willis* called the *Sulphureous* part of the *Urin*: I shall not now dispute *Zwelfer. in Append. pag. 99. Salia purè Salsa fixa. Salia, accido-Salsa fixa.* *Vid. Zwelfer in Append. pag. 99.*

whether that be *Oile*: or, no ſince that ſame *learned* and *inquiſitive* perſon aſſures us he found *no great quantity* of *it* in his Analyſis. *Urinæ Anatome oſtendit quod Elementa è quibus liquor eius conflatur ſunt plurimum aquæ et Salis, aliquantulum Sulphuris et terræ, atq; Spiritus tantillum.*

Willis *de urinis c.* 1.

Yet a word, or two: How doth it appear that *Nitre* is ſo *Univerſally diffuſed through all the Elements?* If he mean the *Ariſtotelian* Elements, did he ever find it ſo univerſally lodged in that *Fire*: is it ſo diffuſed through *Water?* how many *foot deep* is it found in the *Earth?* How doth it appear to be in the *Aire?* Let Mr. *Henſhaw* recollect himſelf. Let him give what *Notion* he will to his *Elements*, the Aſſertion is falſe: although it be true that in this *Terr-aqueous Globe* of ours there is *nothing* occurrs but what contains in it *Salt-Petre*, or ſomewhat that may *firſt* or *laſt*, after greater or leſſer *pains* and *time* be *Animated* into *Salt-Petre viz.* "*Exemplum hoc eſto. Sal Vegetabilium, Animalium, et Mineralium Eſſentialis vel Univerſalis ſuâ naturâ quidem nitroſus eſt, ſed prius flammam non concipit, quàm ex aere* vitam *et* flammam *attraxerit. Salium autem etiam unus citius et libentius altero,* vitam illam *attrahit, prout a Naturâ formatus eſt. Quò fugaciores et magis urinoſi ſunt ſales, eo citius in* Nitrum ſe commutant: *quo mordaciores et magis corroſivi, eo difficilius et tardiùs* Salispetræ naturam induunt. *Sed quia Nitrum Sal eſt utriuſq; naturæ particeps, urinoſæ nimirum et corroſivæ, et quaſi exutroq; Sale urinoſo nempe et corroſivo compoſitus, ejus ope peritus Naturæ Salibus facile ſuccurret, et ex iis faciet quicquid voluerit. Nec Sal ullus eſt in rerum naturâ qui artis adjumento in Nitrum mutari nequeat: Inprimis vero ſales illi, qui igne ſublimantur et ejus vi elevati aſcendunt: ut illi qui in urinâ et excrementis animalium omnium ſunt:* Imo animalia, vegetabilia, et Mineralia ipſa, facile admodum Nitri naturam arripiunt. *Hic primus Salium gradus eſto. Alter gradus eſt Salium, qui aliquanto fixiores ſunt, ut artis filii nuncupant, et in igne a vegetabilibus, animalibus et mineralibus relinquuntur. Hi difficilius in Nitri naturam tranſeunt.*

Glauber. Profper. German. part. 1. Pag. 98. 99.

It is to be noted, that although he ſay *Sea-Salt* and ſome *others* do require much time to be converted into *Petre*: he means when it is to be as it were ſowed & planted, & generated by a *Seminall fermentation*; otherwiſe, he knew, and teacheth ſpeedy waies of generating *Nitre* out of the *fixed-Salt* of *Lyme-ſtone* as doth Mr. *Boyle* out of *Bay-Salt* in his *Origine of ſorts* pag: 116.

Omnium

" *Omnium difficillime illi, qui in tertio gradu ſunt, ut Sal commu-*
" *nis, marinus, montanus ſeu foſſilis, alumen et vitriolum. Nam*
" *hos ars etiam eò deducit, ut in verum Nitrum abeant, ſed diffi-*
" *cilius, cum longiore ad eos mutandos tempore indigeat, quam*
" *ad ſupranominatos Sales fugaces, volatiles et urinoſos. Quare*
" *nemo eâ opinione eſto, quando in Scriptis meis dico quod hic*
" *aut ille Sal in Salem-petræ converti queat; quamprimum lixi-*
" *vio extractus, aut ſaltem ignis calcinatione elicitus fuerit,*
" *quod Sal-petræ verus et ardens futurus ſit*: Tempus adhùc
" requiritur, quo ex aere vitam et animam, alliciat et ardens
" evadat.

Lippis et torſoribus notum eſt, maximam Salis-petræ antehac confecti partem, ex lixivio terræ, ex ovilibus, aliarumq; beſtiarum Stabulis antiquis petitæ, excellam fuiſſe. Quare ex antiquis jumentorum, pecudum et pecorum Stabulis, et non etiam novis? Ideo quia non ſolum vetera Stabula longo temporis progreſſu plus ex excrementis et urinâ Salis imbibunt, eâq; de cauſâ plus Salis-Petræ conſerre poſſunt. Sed etiam Sales ipſi Excrementorum ex animalibus, quod potiſſimum eſt, longo temporis progreſſu exaere animam ſuam acceperunt, quâ recentes nondum imbutiſunt. *Nam, coquat quis, torreat et vexet ſtercora, et urinam animalium, ut volucrit, Nitrum nunquam evadent, niſi ex aere* vitam ſuam *hauſerint.*

Whereas he ſaies, " That the reaſon why Animals
" that feed on Vegetables are obliged by Nature to longer
" meales than thoſe that feed on other Animalls; is becauſe
" that Animals are fuller of that Salt than Vegetables: and
" indeed ſuch Animals are but Caterers of it for man and
" others whom nature gratifies with a more luſty and de-
" licious dyet. —— To begin with the laſt paſſage, *I* obſerve that our *Inventor* hath ſuch a *Pique* againſt *Antiquity*, that he tranſgreſſeth the *old* proverbe *De guſtibus non eſt diſputandum.* It doth not appear to me *certain* that the feeding upon *Fleſh*, as moſt do now: or on *Fiſh*, as moſt did heretofore; is more *delicious* than to feed on *vegetables*, and ſome of *their productions.* Not yet that it is the more *luſty food*, give the *word* what ſence you will. The ſtory of *Daniel's* pulſe, of *St Johan Baptiſt*, of the *Negro's* in the *Weſt-Indies*, of

Zuchinius queſt. medico-legal. l. 5. Tit. 1. qu. 2.

Daniel. 1. v. 5. the

the *Bannyans* in the *East-Indies*. They will not grant it who hold (I think *most truely*) that *before the flood* men lived on *Vegetables*: In the *Golden age* they are not fansied to have had this *delicious* and *lusty food*.

Ovid. metamorph. l. 15.

At vetus illa ætas cui fecimus Aurea nomen
Fœtibus arboreis, et quas humus educat herbis
Fortunata fuit, nec polluit ora cruore.

How many of the *Ancient Philosophers* did *decline* & *decry* this *admired dyet*? but our *Virtuoso* will as little approve of their *Palats*, as their *judgments*. How many of the primitive *Christians* were of the same *judgment*, and liv'd *accordingly*? They were so *universally* inclined to it (I do not mention the *Tatiani* and *Encratitæ*, and other *Hereticks*) that in the Examination of such as were to be admitted into *Holy Orders* it was one Query, *Si nuptias Secundas non improbarent, et carnes non haberent Exetratas. Quin cogebantur prægustare carnes, alioquin Excommunicabantur, et de ordine sui Clericatus deponebantur, ut habes expositum in Can*: 50 51. *Apostolorum*. 1 *Can*. 14. *Carthaginensi, canone primo. Bracharensi primo, et refertur de consecrati dist*. 23. *cap. qui Episcop*. The order of the *Carthusian* Monks at present eat no *Flesh*: yet doth *Arnoldus Villanovanus* demand, *Quis audet asserere quod nemo vitæ longitudinem consequatur sine carnium usu, cum in Monasteriis Cartusienses octogenarii et centenarii mundorum sensuum crebro inveniantur*. When *David* found the *Egyptian* in the field, who had eaten no bread, nor drank any water three daies and three nights: *they gave him bread and he did eat, and they made him drink water*: *And they gave him a piece of a cake of Figgs, and two clusters of Raysins*: *and when he had eaten, his Spirit came again unto him*. And it seemes as if the *general* food of the *Romans* had been *Herbs*: So *Zacchias* imagineth, *Quibus ego addam* Claudii *Edictum, de quo apud* Suetonium *in ejus vita* cap. 22. *quo cavebatur ne in propinis quicquam cocti veniret*, præter olera et legumina: *quæ quidem non contemnendam conjecturam præbent antiquiores*, hæc *pra cæteris cibariis in familiarissimo usu habuisse*; *Est et apud* Horatium

Renatus Mortan in animadv. ad Schol. Salerait. pag. 590.

Arn: de villa Nova de usu carnium pro Sustent ord.. Cartusiens.

1 Sam: 30. 11. 12.

Zacchias, quæst medico-legal. l. 5. tit 1. qu. 2.

locus

locus ex quo ſimilis conjectura deſumi poteſt, cum ſuum victum familiarem ac quotidianum narrat: l. 1. Sermon. Sat. 6.

——— ——— *Inde domum me*
Ad Porri, et Ciceris refero, Laganá, catinum.

I neither find that theſe people *diſreliſhed their dyet*, or wanted of that *luſtineſs* which the *eaters of fleſh* pretend unto. That ſuch as feed on *Vegetables* ſhould be *Caterers of Nitre* for thoſe that *feed upon Animals*, it is either *falſe*, or they are very bad *Caterers*, ſince they ſeldome do their *duty* in procuring *that Salt*: and when *by chance* they may have fed upon *any*, I am confident it is tranſmuted into an *Urinous Salt* in their bodies, ſo that *thoſe other Animals* never get any other than that *univerſall Salt* which is the *radix Nitri* as *Glauber* calls it, but is really no more *Salt-Petre* than it is *Salt Armoniack*; *Salt of Wormwood*, or *Salt of Scurvy-graſs*. No *complexion* was ever ſo altered by being *Sunburnt*, or by the *Small Pox*, as the *complexion* of *Salt-Petre* is in *Plants* and *Animals*, from what it is at the *Work-houſe*.

"The reaſon why Animals that feed on Vegetables are "obliged by Nature to longer meales than thoſe that feed "on other Animals; is becauſe Animals are fuller of "that Salt then Vegetables. —— This *Reaſon* puts me in mind of a *probleme* in *Ariſtotle*, Why *Colts that have ſeen a Wolf, are Swifter than thoſe that have not?* (I think it is to that purpoſe.) After ſundry reaſons given, he adds; *But purhapt there is no ſuch thing.* I profeſs I do imagine it is ſo in *this Caſe*. And waving the queſtion *How nature obligeth them to it?* I never heard that thoſe *Enceratites* and ſuch as *Daniel*, or St. *John Baptiſt* &c. had Stomachs and did *eat like Horſes*: I never read of the *long meales* of the *Bannyans*, or *Pythagoreans*. Any planter in *Barbados*, will aſſure you that a pint of a kind of *bean* which they call *Bonaviſt* with a little Salt, boyld, will nouriſh and ſupport a ſervant more than *fleſh*. The like we obſerve with *Cacao in Iamaica*. The *Hunters* in *Iamaica* that live on *Fleſh* and *Salt* when they are abroad in the Woods, eat much more in *quantity* than when they

eat *bread*, *Cassavi*, or *Patata's* with their *meat*. Besides, there is a bird in *Iamaica*, and the adjacent *Islands* almost as big as a *Turkey* and like one, they call it a *Carrion Crow*, these devour all the offall of the beasts that are slain by the *Hunters*: they are never *fat*, nor *satiated*: *I* have seen some of them feed on *Carrion* from *morning to night* without any considerable *intermission*.

'That facile Ἐγχείρα by which his friend *did convert* "*the greatest part of Petre into a Salt so like the volatile Salt of* "*Urine that they are scarce to be distinguished by smell or tast*: "*yet adding nothing that can possibly be suspected of that nature.* If it be true, and that Mr. *Henshaw* was not *imposed* upon; if this *Nitre* was so changed as that it lost its *inflammability* and *way of burning*, its way of *Crystalliſing* and those other *qualities* which are *proper to Nitre*: how *facile* soever the *Operation* were, it was a *transmutation*, and the *change* was greater than when the *Complexion of Salt-Petre is only altered a little.*

I am tyred with multiplying reflexions upon such a discourse: any one will apprehend that this *great* and *usefull Speculation* of Mr. *Henshaw's* amounts to no more than *wast Paper*. All that I have benefited by it, is to remember a proposition made in Mr. *Hartlib*, concerning the improvement of *Houses of Office*, which I will set down as being more *materiall* to the *publick*, and indeed more conducing to illustrate his *Speculations* than any thing he hath alledged.

Hartlibs legacy Pag. 180.

——— *I have seen Fifty pounds worth of* Salt Petre *extracted out of a vault at* Dowgate, *not very Spacious, which was formerly* an House of Office, *and not emptyed till the matter was throughly rotten. Why may not the same thing be done by* Art, *which was formerly done by* Nature *and* Accident? *I have been credibly informed that such a work is ordinarily done in the Kingdome of* China *and also at the City of* Paris *in* France: *and I see no reason why* English-men *should not have as much wit as they. If any man hath convenient Room to build two* Houses of Office, *and to close up the one whilest he useth the other, then there can be no question but that instead of the charge of emptying, and noysomeness of smell, he may have it emptied for nothing, and feel*

feel the ſweet ſmell of money very gratefull to moſt men, and that in as great or greater quantity than he receiveth for his ordinary edifices: beſides that, he will ſhew himſelf to be a good member of the body politick in which he lives: but he muſt beware that the matter lye dry, *and that no adventitious* moiſture *come to it from* beneath *or* above; *which will be ſomething more chargeable in moiſt grounds than where the Earth is very dry by its own nature.* Agreable to this is the practiſe of our *Salt-Petre-men*, who as often as they meet with any old *vault* of this kind, they make uſe of it to extract their *Minerall*, as being inferior to no *Earths*. And *Baccius* relates that near a certain town, which he calls *Oppidum Fabrianum*, there was a deep and cloſe *Grott* under the *Appennine*, in which Millions of Owles did lodge themſelves, their dung had been accumulated there for many centuries of years: out of this the *Salt-Petre-men* extracted ſo much of *Nitre* as amounted to an *ineſtimable ſumme of money*.

Andras Baccius de therm. l. 5 cap. 7.

So Kircher. Mund. Subter. l. 6. Sect. 2. cap. 4.

And not long agoe, whereas in the Warrs betwixt the *Crim Tartar* and *Polonians* towards *Muſcovy*, great numbers of people being ſlain in battails were buryed for haſt togegether in *great cavernes* in the Mountains, & ſo rotted there: out of *that Earth* in the *Cavernes* there was extracted a great quantity of *Salt-Petre*. From theſe premiſes, and from the conſideration of the dung of *Kine*, *Horſes*, *Goates*, *Swine*, *Sheep*; out of all which *Salt-Petre* is extracted in great quantities, it ſeems as if one might with ſome *Speciouſneſs* argue, that the *Salt* in *Animals* (which is a great ingredient in their nutrition) were nothing but *Nitre altered a little from its firſt complexion.* But whoſoever ſhall conſider with *Glauber* that circumſtance of a *long putrifaction*, and how neceſſary it is the *Earth* be *Animated* and *impregnated* by the *Aire* (ſo that in *Churches* where it is *paved*, they look not for *Petre* but in *open floores* or *Seats* that are *looſly boarded*) and by what *degrees* and *rudiments* it proceeds to *common Salt* (as I ſuppoſe in this caſe the immature Earth abounds with *that* which is afterwards turn'd into *Nitre*, and the Northern Countries that yeild little *Petre* are impregnated with *that Salt*) to *common Salt firſt* (except a powerfull *Seminality* intervene

Glauber. Proſper. Germ. part. per. pag. 96.

Caſimir Semienowicz art mag. artiller. p. 1. l. 2. c. 2.

as in ſhes impregnated with *Mothers*; in Earth mixed with the *Scumme* or *aſhes* aforeſaid) and after into *Salt-Petre*. Whoſoever ſhall conſider this will be apt to reject that *concluſion*, and think that ſince no *Chymiſtry*, nor other *Artifice* can diſcover any *Petre* in *Animals* at firſt, that whatever *Salt* there is in *Animals* and their *excrements*, it more differs from *Salt-Petre* than the change of its *Complexion* amounts unto, and that it is a kind of *Seminall principle* derived from the *Aire*, or ſome other way, that generates by *real tranſmutation* the *Salt-Petre* out of the *volatile* and *fixed Salts*, and (perhaps) *other particles* of *their bodies* and *Excrements*.

I ſhould here conclude my Animadverſions upon this *Hiſtory of Salt-Petre*, but that I think it neceſſary to ſhew the world what a *Plagiary* this *Virtuoſo* is: This *Theory* of *his* with which he ſeems ſo much delighted, is but a diſguiſe of what *Glauber* hath publiſhed in his works, and inculcated more than once. That *inquiſitive* perſon tell us, that there is a certain *univerſall Salt* diffuſed through all parts of our *Globe*, and that the three Kingdomes, *Vegetable*, *Animal*, and *Mineral* are impregnated *therewith*: and that this *Univerſal Salt* is of ſuch a nature that if it be *animated* ('tis his own word) by a certain *Nitrous principle*, *Spirit* or *Seminality*, it will become *true* and *inflameable Petre*. That this *Nitrous Spirit* can never be *incorporated* or *coagulated* of it ſelf: but that it muſt be Sociated with ſome *Saline bodies* and then it becomes perfect *Nitre*. And however he allowes a regard to the *volatile* and *Nitrous Salts* as things moſt facile to *impregnate* with and *tranſmute* into *Salt-Petre*; yet doth he aſcribe as much to the *fixed* (though the progreſs be ſometimes ſlower) as to the *Volatile Salts* in this caſe. *Equidem lubens fateor,, quod Spiritus Nitri ex omnibus fixis Salibus ſibi corpus aſſumendo, ad priſtinam Salis-Petræ naturam reverti poſſit.* From this opinion of *Glauber* (who ſometimes ſpeaks *looſly*, and calls the *Salt* in *Vegetables*, and *Animals*, and *Minerals Nitrous*, and even *Nitre*) did Mr. *Henſham* borrow his Notion of this *Nitre* that is diffuſed through all the *Elements*, and *diſguiſed* in *Vegetables*, and

Glauber. appen. qu. part. Proſpe. Germa. Pag. 23.

and *Animals* and *Minerals*, which *he* omits; fooliſhly!) *Animalia nulla ſibi alia quærunt alimenta, quam quæ terra ipſis ſuppeditat, quibus* Sal-petræ *omnino adeſſe debet.* Salpetræ itaq; eſt omnium vegetabilium Mineralium et Animalium Unicus Servator.—*Sal eſſentiale vel naturæ nihil aliud eſt quam* Salpetræ, *non tamen* ardens *niſi* animatus *fuerit per aërem, et ex eodem* vitam *aut* eſſe ſuum *hauſerit.* —— *Cuncta hæc in omnibus rebus nitrum* OCCULTUM *latere ſatis ſuperq; arguunt. Sal enim mundi, ſive Sal Univerſale et eſſentiale nihil eſt aliud quam Nitrum poſtquam Vitam ex aere extraxit.* What *Glauber's* Opinion is may be gueſſed out of what I have already alledged out of him, where he particularly explains himſelf. How —— our *Virtuoſo* hath *diſguiſed* and *declared his*, I have alſo ſhewed. But perhaps you will ſay that Mr. *Henſhaw* never read *Glauber*, at leaſt *he never takes notice of him*: I anſwer, that in not mentioning of *him* he ſhews his *diſingenuity*: but *Glauber's* treatiſes relating to *Salt-Petre* were publiſhed in the years 1656, and 1659. And that Mr. *Henſhaw* did read him it ſeems evident from this, that his *Hiſtory of Salt-Petre* ſeems rather to be tranſcribed from out of *Glauber's* third part of the *Proſperity of Germany* (who tranſcribed it out of *Lazarus Ercker* overſeer of the *Emperor's* Mines) than from any *Experiments* or *obſervations* of his own and other *Salt-Petre-men*, (with whom *perhaps* he *lightly* diſcourſed) whatever he pretended the begining of his *Hiſtory*: *pag.* 261. For had he minded the *work*, he could not have committed ſo many *Errours*. I believe that I ought to rectify Mr. *Henſhaw's* computation of what *Petre* the liquor holds by computation before it be put into the *Aſh-tubs pag*: 270. and that for *thirty five pound* it ought to be *twenty five pound*: for ſo 'tis in *Ercker*; who followes that way of calculating, which I believe our *Petre-men* do not. Sure I am, that whereas Mr. *Henſhaw* ſaith that the *liquor of the ſecond boyling* when it is ready to Cryſtallize *contains in every hundred-weight about threeſcore and ten pounds of Petre*. That *Ercker* ſaith: *Liquore ſic perfecte parato, ex centenario ejus plus quam* 70 *l. Saliſ-Petræ proveniet.* That Signe alſo of ſecond boyling being boyld to a

Proſper. German. part. 3. *pag.* 112.

proſper. Germ. part. 2 *p.* 66.

juſt height, by hanging like Oile on the Scummer, as falſe as it is, is out of *Ercker*, viz. *Ligula ipſa liquoris bonitatem denotat, ubi liquori immiſſa et iterum extracta ipſum inſtar olei ſibi adherentem exhibet.* Several other paſſages there are, which ſeeme taken out of *Ercker*, about the colour of the *Un-refined Petre*, and the miſtake about the *Mother*, or liquor which remains after *coagulation* how it is to be diſpoſed of. The caſting in of *Vinegar, a pint at a time, and the riſing of the black Scumme* (*pag* 273) is the one a direction, the other an obſervation of *Erckers*. The Caſting in of *quick-lime to make the Petre whiter, and rock the better*; *the injecting of burnt Allom* before that: are the documents of *Ercker*, but not that I hear the practice of *England*. The covering the *Trayes* with cloaths, to make the *Petre begin to ſhoot at the bottom and Rock into fairer Cryſtalls*; Theſe and *many other circumſtances convince me that Mr.* Henſhaw ſtole *his narrative*, and *then certainly* fetcht his —— from no other place. Onely he Spoiles a plauſible *Theory*, and tells us he is *much delighted* with it: and no doubt thereof: So were ſome of the *Society*, and it was an Extraordinary apprehenſion they had of the *Worth* of this *Hiſtory* that they inſerted it into Mr. *Sprat*'s Book: and truely I was as *much pleaſed* thereat, as *They* could be.

Animad-

Animadversions upon the History of making of *Gun-powder*, written also by Mr. *Henshaw*.

Pag. 277.

IF *some of our Wits* were not such Enemies to *Logick* (a part whereof is *Method*) I should have expected to have found in the continuation of the *History of Gun-powder* some mention of *Brimstone*, and its *refining*. And I should have expected a discourse concerning *mute powder*, which however it be not *efficacious*, yet is it a *sort* of *Gun-powder*, and a *noble experiment*. And perhaps it might not have been unworthy the curiosity of an *accurate* Historian to have treated of those preparations of *Gold* and *Steel*, which are called *Aurum fulminans et tonitruans* or *crepitans*, *Ceraunochrysos*; *Mars tonans*: and that other made with *common Sulphur*, and published by *Rolfinctus Chym. in art. red. l.* 3. *Sect.* 2. *c.* 28. These he might very well have inserted, and neither have *Invented over again* (a thing *usuall* with our *Virtuosi*) or have related them as *secrets* imparted unto him by an *Ingenious friend* or Member of the *Royal Society*: which is *agreable to their practice*: thus particularly Mr. *Hooke* suggests unto us the usual Study of the *Signatures of Plants* upon the observation of an able *Physitian*, *a friend of his* whereas that discovery is as old as *Paracelsus* and *Crollius* and in reference to his insinuation of the vertue of *Poppyes* from the Signature, I shall add this *digressing* passage out of *Conringius in addend. ad. med. Hermet. pag.* 400. *Nec verò capiti prodest vel nymphæa flos vel papaveris caput, quod imaginem aliquam capitis præbeant: omnibus enim ejus affectibus deberent prodesse et solis, siquidem agant Specificâ quadam, ut loquuntur, facultate, et capiti proprie sint dicata. Sed et illa capitis effigiem non aliter præ se ferunt*

This is a particular way of clarifying the *Brimstone* and fortifying it so as to be much more servicable: which any one may read in *Casimirus Semienowicz p.* 1. *l.* 2. *c.* 9. There is an account of *mute Powder* (though not tried by him) in the same Author and a way to take of the crack of *Gun-powder*, in *Guilielmus de Sal. c.* 29. of which we heare not a word.

Vide Chrysiscopion Caspari.

Amthour cap. 5. *Scaurt. de conf. et diff. chym. c.* 19.

Cui. erograph. observe. 30. *pag.* 155.

ferunt

ferunt quam poma omnia imo omnes seminum folliculi, quæ tamen nemo duxerit capiti singulariter prodesse. Infinitis exemplis vanitatem doctrinæ ostendere est, si opus fuerit.

But these are not his only *omissions*; for it became him in the *first place* to have represented unto us the *facile* and less *artificiall* waies of making *Gun-powder*, & then the more *elaborate* procedure at the *Powder-mills*. But our *Virtuoso* is above those pedanticall rules of *Logick* and *History*, by which *vulgar Wits* are regulated. Because I think it no *unnecessary* instruction, I shall set down a Method of making *Gun-powder* without any *Mill* at all, as *Casimirus Semienowicz* reports it. "many of our *Country-peasants* know how to "make *Gun-powder* without the use of any *artifice* or *ma-*"*chines*. For we have seen many of the inhabitants of "*Podolia* and *Ukrain*, who are termed *Cosacs* making *Gun-*"*powder* after another manner then is commonly practised. "They take *certain* proportions of *Salt-Petre*, *Brimstone*, and "*Coal*, (which proportions they have learned by long "practise) & put them into an earthen vessel, adding there-"to some fresh water, they boile it over a slow fire for two "or three houres, till the water be evaporated, and the "materials grow thick and Stiffe. Then they take the "mess out of the pot, and drying it a little more in a Stove "or in the Sun, they pass it through an haire sieve, and so "*granulate* it very small. Others take the materials desig-"ned for *Gun-powder* & either upon a plain polished Stone, "or in any Earthen Vessel grind them and mixe them well "together and incorporate them: then they moisten it, and "so granulate it. Betwixt this way of the *Cosacs*, and "that of *Vannuccio Biringoccio* there is a little difference, "which makes me set his down apart. "Having weigh-"ed the materials, each by it self, and having beat and "searsed them each apart, in the end (as the best and spee-"diest way) to compose them together, take the quantity "of *Nitre* you are to use, and put into a Caldron with so "much water as, putting it on the fire to heat, you think "will dissolve it; then take off the Caldron and set it on "the ground in a firme place, and then put in the quantity of

in Art. magn. Artiller. part. 2. l. 2. c. 14.

"of the *Coal* by little and little, ſtirring it about untill it "is well incorporated with the diſſolved *Nitre*; then take "your *Sulphur* finely powdered and ſearſed, and ſtir it in, "ſtirring it continually about with a wooden peſtell, un- "till you have well incorporated all together, and made "the *Coal* fine and impalpable, if you can: then dry it from "all moiſture and ſearſe it very well thorough a fit ſerſe; "and then wet it with a little common water, or a little "Vinegar, and laſtly thorough a ſieve or ſearſe grain it, "and then again dry it well for your uſe.

"To paſs by his *defects* it is a *notorious untruth* with "which he begins his Hiſtory. The materials of *Gun-* "*powder* are *Salt-Petre*, *Brimſtone*, and *Coal*. —— The *Coal* "MUST be Withy and *Alder* equal parts: for Withy "alone is counted too ſoft, and ſome do commend "*Hazle* to be as good as the other two. —— I find that thoſe that made *Gun-powder* at *Coventry* during the late Warrs uſed any *light-wood-coal*, as *Maple* and *Aſpe*: and thought their *powder* as good as any could be. Some have told me that they have known *Birch-coal* very good. I find *Botallus* to reckon up as ingredients promiſcuouſly uſed in the making of *Gunpowder*, *Carbones Cannabinos, ſaliceos, vel juglandeos*, and *Semienowicz* ſaith that if you cannot get enough of *Withy*, or *Hazle* to charre: "*Si Salicis et coryli ſufficiens non* "*detur copia ad urendos carbones, vices horum tilia ſicca ſup-* "*plere poterit. Si exiguam aliquam carbonum portionem pra-* "*parare cupis, virgulta ex coryla et ſalice, vel lignum tiliæ aut* "*juniperi in parva fruſtula ſecta, et optimè ſiccata vaſi alicui* "*teſtaceo includito, et operculo ſigulneâ cretâ ad orificium vaſis* "*firmato, poſtea candentibus undique ſtipatum prunis, per unius* "*horæ Spatium ibidem in uno continuo et æquali ſemper caloris* "*gradu manere ſinito. Frigeſcat tandem ſua ſponte, et uſti eximan-* "*tur carbones. Sunt qui mappas et lineam telam vetuſtam bene* "*et ſiccatam hoc modo in carbonem redigant; cujus etiam non* "*ſpernenda virtus in re Pyrotechnica.* I find another excellent writer of *Pyrotechny* one Signior *Vannuccio Biringoccio* a Nobleman of *Sienna* Printed at *Venice* the third time in 1559. to uſe other materials for his *Coal* then our *Virtuoſo*

de vulner: ſclopet 911.

Dr. *Read* alſo reckons them coals as made indifferently of *Willow*, or ſtrikt of Hemp: of wounds *lit.* 15. *Art. magn.* or till. *p.* 1. *l.* 2. *c.* 13.

propounds. "To make the *Coal* some besides *Willowes* use "the branches of vine: some make it of *Noccido* a *Nut tree* "*Hazel*, *bay-tree*, of the bark of the fruit of the *pine*, and "some of those twigs they make *Baskets* with, some of "young Elder, and some of *Cane* or *Reed*: and in fine, those "coales that are made of *gentle*, *pliable* and *flexile* wood "with pith enough, and that be fine and young and with-"out hard knots, are fit for this use, and it is made in divers "manners in great quantities. It is made after the fashion of "*common coal*. Those *Virtuosi* that have little to do, use to put "*twigs* split into a large pot or other Vessel of Earth, Iron, "or Brass, and cover or lute it well about that nothing may "respire; and then make a fire upon it, continuing it so long "that they beleive the twigs are sufficiently burnt without "flame; and then they let them coole, and take the *coal* for "their use. When I have had present need I have done it "without all this adoe I have taken a quantity of clear "dry twigs, and broke them to pieces and laid them on an "heap close, and set them on fire, and let them burn well: "then with a Scoop or a ladle I have sprinkled water on "them, and then gently scatterd the fire and quenched "them.

But whatever the common practice be, the addition of *coal* is not so *necessary*, but some other things may be substituted instead of it, which practice is usual with those that make *Gun-powder* of sundry other colours besides black.

De pulvere pyrio variis coloribus colorato.

Pulveris communis pyrii nigredo ex carbonum atro colore resultat. Possibile tamen eundem alio quoq; colore tingere, si carbonum loco vel lignum putridum, vel papyrus alba humefacta prius postea in furno calido siccata et in pulverem trita, vel aliud quidpiam simile, facile ignem arripiens et combustibile (ut in sequentibus patebit) sumatur, varijq; colores addantur. Proponemus igitur hoc capite mixturas aliquot ex quibus ipsimet propriis manibus sæpius variis coloribus coloratos confecimus pulveres.

Caſ. Schiene-wicz. art. mag. art. p. 2. l. 2. c. 15.

Pulvis

Pulvis albus.

1.

Salisnitri lb. 6. Sulphuris lb. j. medullæ ſambuci exiccatæ lb. j.

2.

Salisnitri lb. 10. *Sulphuris* lb. *j. corticum vel partis lignoſæ Cannabi decuſſæ* lb. *j.*

3.

Salisnitri lb. 6. *Sulphuris* lb. *j. Taratri ad albedinem calcinati, dein in aquâ communi in ollâ non vitreatâ ad evaporationem totius aquæ cocti unc.*

Pulvis rubicundus.

1.

Salisnitri lb. 6. *Sulphuris* lb. *j. Ambræ* lb. *ſe. ſandali rubri* lb. *j.*

2.

Salisnitri lb. 8. *Sulphuris* lb. *j. papyri exiccatæ et in pulverem tritæ, et in aquâ cinnanobaris aut ligni Braſiliani coctæ et iterum exiccatæ* lb. *j.*

Pulvis luteus.

Salispetre lb. 8. *Sulphuris* lb. *j. Croci ſylveſtris cum vino aduſto prius cocti, dein optime exiccati et pulveriſati* lb. *j.*

Pulvis viridis.

Salisnitri lb. 10. *Sulphuris* lb. *j. ligni putridi cum eruginearis et aquâ vitæ cocti, dein exiccati* lb. 2.

Pulvis cæruleus

Salisnitri lib. 8. *Sulphuris* lib. *j. Scobis ex ligno tilie cum indigo et vino adusto coctæ, dein exiccatæ et pulveris atæ* lb. *j.*

It might have become our *Virtuoso* in an *History of Gunpowder* not only to have declined these *Errors* and *Mistakes*, but to have treated of *these* sundry sorts of powder, thus coloured: as also to have taken notice of the difference betwixt *Cannon-powder*. and that which is used for *Musquets* & *Pistolls*, which distinction, as observable as it is to every ordinary person, is not taken notice of by our *Historian* further then that out of the *same mass* the *great cornes serve for Cannon powder*, *the less for musquet and pistoll*. whereas great Artillery requires other powder then the small; & the *materials* of *Gunpowder* are *differently proportioned* to make up the several powders as appeares by the *pyrotechny* of *Vannuccio Biringoccio*.

To make common powder for *great Artillery*.

Take of Nitre refined three parts.
of Sulphur 1 part.
of Coal of Willow 2 parts.

To make that for the middle sort of *Artillery*.

Take Nitre refined 5 parts.
Coal 1 part and an half.
Sulphur one part,
Let it be well incorporated, granulated and dryed.

To make that for Arquebusses and Pistolls.

Take Nitre refined 10 parts.
Coal of Hazell-twigs cleansed 1. part:
Sulphur 1 part.
Some to make it better.

Take

Take Nitre, 13 parts and an half.
Coal two parts.
Sulphur one part and and an half.

Let them be well beaten and incorporated &c.

I find alſo the accurate *Caſimirus Semienowicz* to make a treble diſtinction of *Powder* which I ſhall ſet down, as being the *beſt* and moſt *approved in the world.* which when I have done we ſhall not much lament the concealment of that *cheat* or *ſecret* Mr. *Henſhaw* could well learn, but with promiſe not to divulge it: it not being other then to ſubſtract from the *Petre*, and make up the weight in *coal* whileſt (by this improvement of *Gun-powder* by the *Virtuoſi*) his *Majeſty* payes as if there were the proportion of *Salt-Petre*,

Mixturæ ad triplicem pulverem conficiendum optimæ probatiſſimæq;.

Mixturæ pulveris ad tormenta Majora.	*Mixturæ pulveris ad Sclopeta majora vulgo muſquetas.*	*Mixtura pulveris ad Sclopeta minora, vulgò piſtolos et alia.*
1	1	1
Salisnitri lb. 100.	*Salisnitri* lb. 100.	*Salisnitri* lb. 100.
Sulphuris lb. 25.	*Sulphuris* lb. 18.	*Sulphuris* lb. 12.
Carbonum lb. 25.	*Carbonum* lb. 20.	*Carbonum* lb. 15.
2	2	2.
Salisnitri lb. 100.	*Salisnitri* lb. 100.	*Salisnitri* lb. 100.
Sulphuris lb. 20.	*Sulphuris* lb. 15.	*Sulphuris* lb. 10.
Carbonum lb. 24.	*Carbonum* lb. 18.	*Carbonum* lb. 8.

Mixturæ pulverum ad Tormenta & Majora Sclopeta, inter pinſendum vel Simplici aquâ tantum, vel aceto, vel urina, vel vino aduſto humectari et inſpergi poſſunt. Sin autem ad Sclopeta minora

minora fortiorem vegetioremq; exoptamus pulverem, superiores duæ mixturæ sequenti liquore, vel aquâ ex corticibus malorum Aurantiorum, et Citriorum, et Limoniorum recentium Chymicis organis distillatâ inspergantur sæpius, pinsenturq; per Horas 24 deinq; in mixtissima granulentur.

Liquor autem componitur ex vini adusti i mensuris 20. Spiritus aceti ex vino albo distillati mensuris 12. Spiritus Nitri mensuris 4. Aquæ simplicis ex Sale Armeniaco mensuris 2. Camphoræ ex vino adusto subactæ, vel cum Sulphure trito pulveri satæ, vel deniq; cum oleo Amygdalarum dulcium in oleum redactæ, mensurâ 1.

Aqua ex Sale Ammoniaco.

Rec. Salis Ammoniaci 3 drach. Salis Nitri unc. 1 redigantur in pulverem tenuissimum et probe misceantur: postea in Alembicum imponantur, et aceto fortissimo infuso, distillentur igne lento

I have oftentimes wondered with my self how it was possible for Mr. *Hexsham* to penne, and for the *Royal Society* to approve so pittyfull an *History* of *Salt-Petre* and *Gun-Powder*. They are certainely a lamentable sort of *Scriblers*, that write so *ill*, having so *good Copies* before them! That noble *Siennois* whom I have already cited; *Nicolo Tartaglia* in his *Quesiti et inventioni diverse*: and *Pietro Sardi* in his book *L'Artiglieria* have written excellently well of *this subject*: and in the year 1650 *Casimirus Semienowicz* a *Lithuanian* Knight and formerly Lieuetenant of the Ordnance to the King of *Poland*, publisshed a most Elaborate discourse about the use of the *great Artillery*; He was a man that made those studies his business & having signalized himself byhis skill in the management of all manner of Artillery, he was employed & Honoured by *Uladislaus* the 4 th. King of *Poland* & *Sweden*, by him incouraged to that work, & to accomplish it the better at his charge sent into *Holland* there to perfect his knowledge. This *Eminent* personage in the second book of his first part hath handled all that appertaines to the making of *Salt-Petre* and *Gun-powder*, to the tryall, and to the keeping of it: And were not the discourse too long, I had inserted it here but because I have already made use of several passages out of him, I shall here adde the discourses onely of *Pietro Sardi* and *Nicolo Tartaglia*; where they are *defective* or need

nced amendment I ſhall ſupply all out of *Cas. Semienowicz.* whom *Kircher* calls *Semienovius*, in his *Mundus Subterraneous*, and out of him tranſcribes moſt that he hath about this ſubject there.

The Diſcourſe of *Pietro Sardi* about *Salt-petre*, & *Gun-powder*, in his book *L' Artigleria lib.* 3. *Cap.* 49, 50, 51. 52, 53, 54. printed in *Venice*, in folio.

Sal Nitri, being the Ground-work, ſtrength and Spirit of the Powder which by the *Quantity* and *Perfections* of the *Nitre*, is ſaid to be more or leſs *fine* and *effectual*, it ſeems good here to diſcourſe ſomewhat concerning it, *whence* it is *Generated*, how *made* and *Reduc'd* to perfection; to the end the *Gunner* in every occaſion, (wanting *Powder*, *Powder-makers* and *Saltpetre-men*,) may know how to make it, if not in that *perfection* which the *Saltpeter-men* do by their Art, yet at leaſt ſuch as may ſerve in time of *Neceſſity*.

Sal Nitri is Extracted from the Earth in great quantities, and from *Walls* in ſmall; to wit, from that Salt, which ſome walls of *Cellars* and *vaults* under Ground, expoſed to Humidity do ſpue forth.

It is drawn from the Earth, but not in all places, but ſuch as are *Proper*, as thoſe are, that are *obſcure* and *Cavernous*, whete the rain falls not, as in the *ſtalls* of Animals great and ſmall, and Particularly *Goats*, *Sheep* and *Hogs*. In *Gaſcoigne* in *France*,

Terra et materia Salnitroſa plerumque reperitur in maxima copia in locis obſcuris, umbroſis, & cavernoſis, ad quæ tam radijs Solaribus, quam pluviæ et omni dulci aquæ aditus præcluſus eſt. Tum etiam in equilibus, & aliis clauſtris non Subdialibus, ſed tectis, ubi omnis generis pecora: ut ſunt boves, capræ, ſues, oves, et his ſimilia alia locari et concludi: necnon ubi homines ipſi urinam reddere ſolent. Tum denique in illis locis in quibus poſt campeſtria commiſſa prælia, plurima cæſorum militum corpora in foveis conjecta, et ſuper his immenſæ terræ moles ſuperextructæ ſunt. Et his poſt multa annorum intervalla, plurimum materiæ Salnitroſæ erui vidimus in Valachia et Podoliæ deſertis inter Bohem, et Boriſthenem. *Cas. Semienowicz* p. 1. l. 2. c. 2. yet in *England* I cannot hear that they digge for it in places dunged with Sheep although the *Covert*, and time may have ſeemed to have concurred apparently to generate it.

France, I went in the company of the Commissary of the Artigliery of the City of *Burdeaux*, through the *Coverny* of the little hills and Mountains, that are scituated on the River *Garonne*, drawing and digging in many places, Great quantities of this *Salt-petre-Earth*; and in *Bruſsels* I have seen them draw *Sal Nitre* from *Rubbiſh* and *Duſt* of old *walls*.

And in *France* there is *Commiſſion* given to the Principal officers of the *Artillery*, diſperſed through that vaſt Kingdome, to enter into all houſes *private* and *publique*, to find out ſuch *Salt-Peter-Earth*; and the private perſons are forced to be patient becauſe it is for the ſervice of the *King*.

There are *Three* ways to know if the *Earth* be Pregnant of *Salt-Petre*. 1. with the *Mouth*, putting a little on the tongue, if there be ſenſe of a *biting* taſt. 2. with a *Burning* Iron, thruſt into a hole made with a Sharpe woodden Stick, and ſuffering it to Coole there; and if upon drawing it out it appears of a *yellow* whitiſh Colour, it is a ſigne there is *Nitre* there, but if it remains of the natural colour, it is unprofitable. 3. It is proved likewiſe, taking a handful and ſprinkling it ſightly on burning Coales, if there be perceived any crackling noiſe, and any ſparkles iſſues forth ſpeedily, it ſhall be a ſign of *Salt-petre-Earth*, otherwiſe of none.

Having got great quantity of this pregnant *Earth*, you ought alſo to have Ready a good quantity of Aſhes made of *Oakes*, * *holme Oake*, or * *Vine-branches* or ſome other Strong wood, with a ſufficient quantity of *Quick-lime*, which things being thus prepared, take *two parts* of the ſaid *Lime* and *three* of *Aſhes* and let them be well mingled together.

Let there be alſo prepared a *Great* * *veſſel*, placed on high, in ſuch manner that under it may ſtand another veſſel to Receive the water, that ſhall be ſtrained from that above.

In the *upper Veſſel* ſhall be put *broom* or *ſtraw* in the Bottom or plain, and over the hole where the water is to iſſue out, ſhall be placed a Piece of a *Tile*, or ſome ſuch thing as the women do in their *Bucks*; and the Hole muſt be ſtuft very well.

Afterward take the *Sal-nitrous* Earth moderately *dryed*, and put it into the veſſel a handfull thick, and upon that a ground

These three ways are approved by *Cas. Stanienowicz*; but if he ſay that *Salt-petre-earth* bites a little to the taſt. *linguam mordacius corradit*, he doth not ſay it is *bitter*, as Mr. *Hedhaw* doth. p. 266:

Si citrei et ad albedinem vergentis aliquantulum coloris in ferro frigefacto ſigna inveneris de valore et bonitatet erre non dubties. *Cas. Stanienowicz.* p. 1. *l.* 2. *c.* 2.

Si ſtrepitum aliquem edere et lucidos in altum ſurgere favillos obſervaveris, multo ſale nitri terram ejusmodi abundare judicabis, *id. ib.*

Cineris uſti ex robore, fraxino, ulmo, acere vel aliis fortibus et duris ligni s *ib.*

* Cerro.

* Sarmenti ſignifies alſo flags, ſegs, or Reed growing by the waterſide,

Hujus cineris ſumantur partes *duæ*, et calcis viva *tres* ac tuta bene misceantur. *id. ib.*

* Tinaccio, a tun, a Bugada,

Ground (of two or three fingers high) of that *Ashes* and *lime* mingled together, and then a ground of *Earth*, and againe of *Ashes* and *Lime*, continuing this Course untill the vessell be full within a handful and an half.

Paululum exsiccata. *Cas. Semienowicz*, ubi supra

This being thus managed, let it be filled up with common water sweet and clear in which is not the least salt, and because the Earth will quickly suck up the water, let it be put in so by degrees till the Earth will admit no more, and the vessell be filled equal to the Earth, and not higher.

Infundatur recentis et dulcis aquâ tantum, quantum sat esse videbit ut atque duos tresve digitos, terræ super extet. *id. ib.*

It being thus filled, let it stand twenty four hours, or more, after which time open the tap-hole, and let the water strain into the vessell underneath, which being all strain'd, let that water be emptied into another vessel or Tun and reserved, and then put in some fresh water into the *Earth-vessel* as before, letting it stand for the space of twelve hours, then opening the *tap-hole* again let it strain into the vessel, which done, put apart into another vessel this liquor, and not in the first: Do this a third time and empty it into a third Vessel.

Untzerus presents us with another way of making *Salt-Petre*, which because our *Historian* hath omitted, I shal set down: *Terra nitrosa aqua multa diluatur, deinde ad purum colatur. colatura si non satis dives balinitro est, denuo apponitur materiis et iterum cocta facto sedimento per lacinias transfertur in vas purium ibique coquitur, ad justam consistentiam Decoctum infertur in Ollam, Digestum per dolia et alveolos, crystali congelati eximuntur, residuus liquor recoquitur ad medias vel tertias donec gustu sit acris, et gutta super aramento concrescant unde iterum expectandi crystalli. et sic pergenum donec totum coagulaverit. Untzer: de sale c. 18.*

This being done, make proof of these three waters by putting some few drops on your tongue, and tasting it you shall find the first *very biting*, the second lesse, and the third least of all, for the first draws more of the substance of the *Salt-peter*, then the second, and the second then the third.

But there may be the fourth operation, for sometimes the *Earth* doth retain so much *Nitrous* substance therein, that it may prove advantageous even to the fift and sixt time; and all the waters are to be reserved apart, with the distiliations of the first, second, third &c. as many as there shall be.

By this operation of one vessell or tun, may be apprehended the manner of making an hundred or as many as you please, according to the Quantity of the Prepared *Earth*, observing always that the first waters strain'd be put in one vessel, or in what will contain them, and all the other waters (Carelesly) in one or more vessels that will hold them.

These last waters shall be taken and forced to pass over New *Earth*, operating as before, and so many times shall they

Pass over new earth untill you find the water sufficiently impregnated with *Nitre*, which you shall easily know by the tast; for the tongue will be hardly able to indure it for the great heat, and the waters will bear almost a new layd Egge without sinking to the bottom.

Igne lento primus, dein fortiori decoquatur ad consumptionem unius tertiæ. *id. ibid.*

Having Collected a sufficient quantity of this *Nitrous* water you must put it into one or more Great *Brazen* or *Copper* caldron (like those of the *dyers* accommodated to a fornace) which being filled of two thirds of such liquor (i. e.) in such manner that a third part of the caldron be yet empty, give fire to it at first gently, afterwards more strongly, by degrees, untill the boyling be well advanced, and so continue untill the caldron be but one third part full of liquor, or to say better untill but half of what was put in do Remain.

Coque ad consumptionem medietatis, vel quousque spissior et densior evadat. *id. ibid.*

The waters of one or more Caldrons being boyled and reduced to such a Quantity, let them be gently taken out, and put in a Capacious Tun, or Tuns, well hooped with hoopes of Iron, and let them be covered with hempen cloath and tables upon them very diligently, and so let them be left untill they coole, and that they be setled very well in such manner that all the Earthy substance and naughty *Salt*, be fallen to the bottom.

* *Congeli.*

These waters being thus purified let them again be gently (that they be not troubled but the common Salt and earthiness left in the bottom) Returned in to the cleansed caldrons, and they being boyled as at first untill one half be consumed, or at least untill you know it be boyled and be coagulated, which will be known, when taking a little upon a stick and dropping it on a Polish'd marble or stone, if it remain congealed, or to say better thickned, it is a sign it is boyled, and therefore take it from the fire and suffer it to coole.

Effundatur in ligneos canales, vel vasa alveata oblonga et lata magis quàm profunda: nec tamen plus hujus aquæ sit in uno vase, quàm ut spatium unius palmi in altitudine occupet, deinde vasa sineis vel laneis pannis crassioribus contecta in frigido loco ponantur. *id. ib.*

It being thus cooled & clarified, let there be ready some *Trays* made of Planks long & not too large nor too deep, but more large in the top then in the botome, let these be filled with the boyl'd and clarified waters a handful high, putting into them some little sticks of wood without Barke, and cover the *trays*, and let them stand so two or three days, and at that time or longer, according to the season you shall find the *Sal-Nitri*, Congeal'd

Congeal'd and cleaving to the ſides of the *Trays*, and the ſticks, (after the manner of clear Chryſtall;) which take away careſully and the water that Remains, let it be put to boyling anew as at firſt, leaving the ſalt and the dregs in the bottome of the *Trays*.

And becauſe the waters in the boyling ſwell, and make a ſcum it will be neceſſary to take away that ſcum careſully, (as they do from the fleſh-pots) and to reſerve that ſcum to throw it upon the Earth taken from the Tuns to reimpregnate it with *Salt-petre*.

Moreover becauſe the water in boyling will ſpatter out of the caldron, to remedy this let there be ready a ſtrong *lie*, made 3 fourths of ferne Aſhes, or the aſhes of *Oak holme*, or *Oak* or with *Aſh*, or *Maple* (ſuch as was uſed at the firſt elixiviation,) and of one fourth of quick-lime, and in the ſaid ſtrong lie, for every hundred pints let there be diſſolved four pounds for *Roach-allum*.

And of this lie ſo prepared, take one or two potfuls, and throw it in by little and little when the Caldron ſwells, and it will preſently be quiet, and deſcend, and become of a clear *Azure colour*, and the dreggs of the common *ſalt* will fall to the Bottome.

Of

Of the manner to refine *Sal-petræ* to make *gun-powder*, cap. 50.

ALL the vigour of *Gun-powder*, consisting in *Sal-petræ*, its quantity, and its *perfection*, if the *Sal-petre* should be put in use of the first boyling, the *Powder* would not be so *perfect* and so strong, as need would require; for the quantity of Terrestriall matter, Common *salt* and *unctuosity*, which also reside with the *Petre*, do hinder its vertue and strength, and therefore the *Artists* do always anew *Refine* the said *Salt-petre*, and purge it from every extraneous matter, as much as is possible, that they may obtaine the most strenuous effects of *Powder*, that can be desired.

Necessarium bis aut ter (immo pluries adhuc si tanto majorem pulveris effectum habere volumus) purgasse et clarificasse *id. ibid. c.* 3.

This Refining is made in two manners, either with water commonly called the *wett*; or with *Fire*, commonly called the *Dry*, or the *Burnt*.

A Guzzo.

The *wett*, or with *water*, is made thus; They take as much *sal-nitre* as they please to *Refine*, and put it in a Caldron over a fornace, and upon that *Sal-nitre* they put such a quantity of fresh and clear water, as may be sufficient to dissolve it; they take notice of the quantity of the water, and for every barrel of water which they put into the Caldron, they put five or six Pot-fulls of that strong *lie*, made of *Ferne*-Ashes, *Oake*, and *Quick-lime*, and *Allum*, and giving fire to the Caldron at first softly, and afterward increasing it, un till the melted *Nitre* boyle and rayse a scum.

Aliquot cyathi; *Cas, Semienowicz. ib. c.* 3.

Sabbiare, sand or gravel. Imponatur Sabulonis loti et bene purgati tantum, ut ad altitudinem unius palmi super fundum vasis emineat. *Cas. Semienowicz ibid. c.* 3.

Let there be ready, a great Tun or vessel placed so high that another vessel may stand under it to receive the *Sal-nitrous* water, which by little shall strain from above, and in the said great Tun let there be put a hands-breadth of cleane and wash'd *Sand*, and upon that a great linnen cloth doubled, (as the laundresses do) and on that poure the water from the Caldron, (which contains the melted *Nitre*) as soon as it boyles and the scum is taken from it, and let it strain by little

and

and little by the tap into the vessel below, as they do in making their *Bucky*.

Which water being all strained, let it be put into a cleare Caldron and boyl it till by the proof of a Congealed drop, it may be known to be well boyled, (not forgetting to give it some of the strong *lie*, of *Allum*, *Ashes* and *Lime*, when the Caldron swells and would spatter out the water, and having made proof it is boyled enough, let it be taken out and put into the long *Trays*, to coole as before, and preserve the congealed *Salt-petre*, and returne the water to boyle again that remains, and againe to congeale, and do so untill the water Give no more *Salt-petre*.

Now this *Salt-petre* so Refined, is called *Salt-petre Refined* of the second boyling, as the *Refiners*, of *Sugar*, call their *Sugar Refined*, of the Second, Third or fourth, boyling, and to make *Saltpetre* of such perfection, you may (as some do) *Refine* it, that is Reboyl it, in such manner the third time, proceeding always as before.

Because that there is such difficulty in the depurating of *Salt-petre* from the fixed common *Salt*, Allum & Vitriol which adhere to it, & that, without this be done, no man can judge whether the *salt* it leaves upon calcination be from the Nitre, or some other body, which by the usual process even of Mr. Boyle, by filtration and coagulation can never be perfectly seperated, nor the *Fixes* reduced to crystals of the right Signature. *Quemadmodum enim sudis et labore magno Salpetrae ex feberibus bestiarum ernutas per solutionem et coagulationem purgatur, impossibile tamen est, ut mundities suam debitam et Signaturam veram consequatur*, so *Glauber. de signat. Sal.* pag. 27. And because the crystals of *Nitre* appear best in their own shapes, after such an exact depuration, it may not be omitted to tell you what Mr. *Hinspan* might have done, for it is evident he had read *Glauber*, viz. that the safe way of making pure *Nitre*, is to take the course Mr. *Boyle* found out, to burne part to an *Alcali*, and to powr upon a filtrated solution of that the Spirit of *Nitre*, and evaporating it to a cuticle, to crystalize it in a cold place; But there is another way that may not be unfitting in *Casaubon Sementivier. p. 1. n. 2. & Sunis* [illegible] *simul misce, & pulveri fiant. Postea paratis omnibus, mitte in testa aliquantum aquae, & aceti, vel vini, aut in defectu harum aqua dulcis limpida superinfundatur, bona quantitate, ut fiat lixivium. Quod per triduum frigidum sibi relictum, clarescat. Pone deinde salem nitri in caldaria, et superinfunde tantum*

tantum lixivij ut salem-nitri cooperiat, pryeog; lento igne ad consumptionem media partis totius liquoris: residuum effunde in aliud vas, faces autem omnes immundas, quas fundum caldarij petiisse videbis foras ejiace. frigescat postea aqua salnitrosa et ulterius elaboretur, more consueto, that is in such manner, as is prescribed by *Sordi* and *him*, in the first boyling of *Salt-petre*.

The Refining *Salt-petre* by fire, to wit the dry, is made in this manner, they have a great and capacious and thick vessel of *Brass*, *Copper*, or *Iron*, placed on a Fornace, and in that they put, what quantity of *Nitre* they please, and making a gentle fire at first, and increasing it by degrees untill the *Nitre* be perfectly melted and running, and begins to boyle, and having ready fine powdered *Brimstone*, they throw some of it in the top of the melted *Nitre*, and if the *Brimstone* fire of it selfe, it is well, if not with a coale, or having a stick they fire it, and this *Brimstone* so fired, they let alone untill it have consumed all the grease which swims upon the said *Salt-petre*.

The which being all consumed, the *Salt-petre* is emptyed into what vessels a man will, that the Loaves or Pieces of *Salt-petre*, may become large, of which he may prepare what quantity shall seem sufficient, and in the bottom of the Caldron will remain the Dreggs and common salt, the *Salt-petre* being cooled, becomming like a piece of fine white Marble, & in this manner you may refine it as often as you will, and it shal always prove more perfect, and worke greater effects.

Of the Manner how to Re-impregnate the Earth, taken out of the Vessells with new *Salt-petre*.

HAving taken out the Earth from the Vessels, after that the water hath extracted al the *Nitrous* substance therefrom, let it be spread on the face of the Earth, but not exceeding a foot thick, and in some covered place, that it be subject to neither Rain nor the sight of the Sun.

Which Earth being so ordered and spread, get a great quantity of Dung, as well of great Cattel as small, and spread

ſpread it on the Earth, as thick as you can, one or two foot thick, or more if you have dung enough.

Upon this dung caſt all the ſcum, and the waters which were taken from the *Salt-petre*, leaving the Earthy dreggs, and the common *ſalt*.

And afterwards gathering in all publique places, in veſſels prepared to that purpoſe, as much Human urine as is poſſible, and every Day caſt it on the *Dung*, and doing ſo at two years end, that Earth will be impregnated, with as much *Nitre* as ever, and it may be with greater advantage.

How to prove *Salt-petre*, to know its fineſs. *Cap.* 52.

TAke a Pound of *Salt-petre*, and put it on a ſmooth white Table, and with burning coales fire it, in the doing whereof note theſe effects.

If it make a noyſe as *Salt* does, when it is caſt on burning coales, it ſhall be a ſign that it reteins in it much common-*ſalt*.

If it make a fat *ſcumme*, it is a ſign it hath too much fatt.

If after it is all burnt, it leave in the bottom filth, it is a ſign it yet retains ſome of the Earthy ſubſtance, and the greater theſe ſigns are, ſo much the more extraneous matter doth the *Salt petre* contain, and it is ſo much the leſs purified fine, and of leſs Vigour.

But if the flame it caſt be * cleare, windy, long, divided into many parts, after the manner of Brandiſhing Rays, or beams of light, that the Table remain clean, if it is burn'd as pure coale that makes no ſcumme or noyſe, then the *Salt-petre* may be ſaid to be well purified and perfect.

* Si fecerit flammam claram, longam, & in plurimos radios diſpertitam, fundum vero tabulæ remanſerit mundum: arſeritque puri carbonis modo, ſine omni ſpuma & crepitu horrido, minuſque convenienti, purgatum bene & perfectum eſſe ſalem nitri conjecturam capere licebit. *Caſ. Semien. wiz. ibid. cap* 7. & *Kircher. Mund. Subterran. lib* 6. *Sect.* 2. *cap.* 3. Quidam injectum candenti prunæ ſpectant, argumento bonitatis & puritatis, ſi diffluat & deflagret ſine reliquiis ſalis communis, aut fœcum terreſtrium, & ſaltu crepitante. *Libavarius, Apocalypſ. Hermet. part.* 1. *cap.* 17.

How to know the goodneſs of Powder. *Cap.* 53.

The goodneſs of *Powder* is known by the *Eye*, the *Touch*, and by the *Fire*: by the *Eye*, if it be very *Black*, or that it is Moiſt, and put upon white paper and tinging it with black, it is a ſign that it hath too much Coal, but if it be of *dark Aſh-colour* and tinge not, it is a ſign that it hath its proportion of *Coal*, and it is dry.

Berettio, Grey or Aſh-colour.

Nimia in pulvere nigredo, ſignum eſt humiditatis: hæc ſi ſuper papyro munda ponatur, & eandem nigro tingat colore, ſignum erit eum plurimum in ſe continere carbonum: cinericius autem ſub obſcurus pulveris color, & aliquantulum ad rubedicem vergens, bonitatis veſtigium eſt. *Caſ. Semienowicz, ibid. c.* 17.

With the *Touch* it is known, when rubbing it with the fingers, it appears ſoft and eaſily broken, it is a ſign of too much *Coal*: and when rubbing it and powdering it with the fingers, you feel ſome little knobs that prick the fingers, it is a ſign the *Sulphur* is not well powd'red and incorporated, and that the Powder is not elaborated enough.

Denique ignis beneficio in notitiam bonitatis pulveris facile devenietmus: ſi nimirum puſillas aliquot congeries pulveris ſuper tabula lignea munda & polita, latitudine dimidii palmi a ſe invicem diſtantes poſuerimus, & unicam tantum ex omnibus incenderimus. Hæc ſi ſubito flammam conceperit, & ſola tantum, aliis non accenſis, conflagraverit, idque cum fragore & ſonitu quodam: foecritque fumum album, clarum, & in aſcendendo velocem: in acre vero circulus quaſi quidam, ſeu corolla fumoſa appareat, perfectiſſime pulveris nota erit.

With the *Fire* likewiſe is known the goodneſs of *Powder*, taking a pound of it, and putting it on a Table ſmooth and white, and near unto it another, a third, fourth and fifth pound, ſo that they do not touch: and then giving fire unto a little heap, if at one and the ſame time all the heaps are fired, if the flame be raiſed clear and quick, cracking in the raiſing, it is a ſign it is fine and well labour'd, but if the flame be ſlow in raiſing and with much ſmoke and without noyſe, it is a ſign of the little ſtrength of it, of the great quantity of *Coal* and *Sulphur* more than it ought.

If after it is burnt the Table remain black, it is a ſign of too much *Coal*; if *fatnous*, it is a ſign of the *greaſe* of the *Salt-Peire*,

Petre and *Sulphur* that were not well refined: and if with earthiness, and little granulets of matter, it is a sign the *Salt-Petre* was not well purged of common Salt, and earthy matter, and that the *Sulphur* was not well powder'd and incorporated; and if after the powder is burnt, the Table remain whitened, it is a sign the *Salt-Petre* hath much of common *Salt*, and that it was not well cleansed from that.

Of *Powder* spoiled, and the ways to *Recover* it.

BY *Powder* spoiled is meant that which wants much of the vigour and vertue which it had in the beginning: now this want proceeds from no other thing, than that the vertue of the *Salt-Petre* which gives it that vigour is weakned and vanish'd.

Now the Vertue of *Salt-petre* reduced into *Gun-powder*, is lost either by *Age* or *Moisture*; by old *Age*, because being conjoy'nd with *Coal* and *Sulphur*, it doth participate of that corruption which will happen to them in time: by *Moisture*, because the *Salt-petre*, (composed of *Salnitrous* Waters, as all other *Salts* of their *Salt Waters*) does no sooner as it were see the moisture, but by that, by little and little it is converted into moisture, and the vertue and vigour thereof is exhal'd by that humidity.

Thus a great part of the *Salt-petre* being separated by this Humidity from the rest of the Composition of the *Powder*; and the *Salt-petre* being more ponderous than the other two materials, which are not exhaled, as is the *Petre*; it follows, that of that quantity of Powder which in the perfection of it was inclosed in the Barrel: For example, one hundred pound, after the *Salt-petre* is wasted in this manner either by old Age or Moisture, there will not remain the same quantity, but much less.

Carbones tramen & sulphur minime hic suo quem antea habuere, privantur pondere, cum nullo dissolvuntur humore: imo carbones studiose eum attrahunt, fiuntque ponderosiores. *Id. ibid. c.* 18.

Now to recover this Powder thus wasted, it is to be done two ways, *viz.* to adjoyn the quantity of *Salt-petre* is wanting to make it *vigorous* and perfect; or to take away that

Salt-petre which remaining in the wasted Powder, to refine the *Salt-petre*, and to make other *Powder* anew with it.

There is another way of recovering decayed *Powder*, by fortifying it with a certain *Lixivium* proposed by *Casp. Simnowicz. p. 1. l. 2. c. 18.* which you may see in him.

To recover that same weakned Powder, by the vanishing of the *Nitre*, proceed in this manner: Take all that quantity of wasted *Powder*, and put it on a cloath, and lay it in the Sun to dry, which being perfectly dried, fill a Barrel with it: for example, let there be one hundred pound:

Then let it be emptied aside, and let the Barrel be filled with perfect *Powder*, such as was the spoil'd in the perfect vigour of it, let it be weighed and noted how many pound it weigheth: for example, suppose one hundred and twenty.

Here we say that those twenty pound more which the Barrel of perfect *Powder* weighed, shall be twenty pound of *Salt-petre* which the other wanted.

Now let us see how much wasted Powder there is in all, and if there be for example 10000 pound; for to know then in this great quantity of naughty powder how many pounds of *Salt-petre* there are wanting to reduce it to perfection and vigour.

Work with the Golden Rule of the 4 Proportionals, saying, If one hundred pound of wasted *Powder*, there want 20 pound of *Salt-petre*, how much *Petre* will there be wanting in ten thousand?

Let the second number be multiplied by the third, *viz.* 20 by 10000, and the product shall be divided by the first, *viz.* by 100, and you shall have 2000 in the Quotient, and these shall be the pounds of *Salt-petre* which are wanting in the wasted powder to reduce it to perfection.

Let these 2000 *l.* of *Salt-petre* be powder'd, & likewise the 10000 of bad powder, as the manner is, and taking a proportion, let it be incorporated with the 2000 of *Salt-petre*, beating them together according to Art; and in such manner working them, there will be made good *Powder*.

If we will take away all the *Salt-petre* out of wasted powder, we must proceed in this manner: Let there be prepared one or more capacious Tubbs, and on them let there be laid three or four linnen Cloathes (like the skins of a Drum) well tied, but not so strait. Then

Then let there be another Veſſel or more of Copper or Wood, and put therein the quantity of ſpoiled *Powder*, that ſhall ſeem fit, and pour upon it as much freſh clear Water as ſhall diſſolve it, ſtirring it with a cudgel or a Schoope.

This being liquified, with a Ladle or Bucket, throw it upon the cloath over the Table, that the clear water may ſtrain into the Tubb, and upon the cloath may remain the *Coal* and the *Sulphur*: and when it is all ſtrain'd, throw ſoftly a Bucket or two of water to draw away the ſubſtance of *Salt-petre* that ſhall remain with the *Coal* and *Sulphur*.

And in this manner ſhall be done until all the Salt-petre of the naughty powder be ſtrain'd, drawing away the ſtrain'd water in the Table when it is full, and if theſe waters are not clear, let them be put on again on the waſhed and cleanſed cloath, and let them be ſtrain'd again, until they are clear.

Then take all theſe clear waters and boyl them in the Caldrons as before, and then put them in the Trays to congeal and make *Salt-petre*, and taken and refined, and new *Powder* made of it as the manner is; and the *Coal* and *Sulphur* may be dried perfectly, and proof made if it will ſerve, but if not, you muſt take new *Sulphur* and *Coal*.

But here I do advertiſe that all that is here ſaid, is written only that the Gunner in time of Neceſſity may ſupply himſelf and do the beſt that he can, for ſuch *Salt-petre* and *Powder* is not made with that diligence and *Art* that the *Powder-Maſters* and *Salt-Petremen* do, but yet it will not fail to ſerve in time of Neceſſity.

Dal. Pietro Sardi: in Venet. 1629.

The

The Third Book of the various Questions and Inventions of Nicolas Tartaglia.

Of *Sal Nitre*, and the various compositions of the Gun-Powder: of the Propriety or the particular office which each of the Materials hath in that Composition, and other Particulars.

The first enquiry made by Seignior Gabriel Tadino Prior *of* Barletta.

Prior. IS it not to be wondred at, that the Antients had no knowledg of *Sal-Nitre* which to us Moderns is become so familiar?

Nicol. *Yea, Rather the knowledg of that Simple is most Antient; for most of the Antient* Naturalists *make mention of it; true it is that some of them, and especially* Avicenna *have called it* Baurach, *because it is so called in the* Arabic *Tongue; some* Aphronitum, *because it is so nam'd in the* Greek; *and others as* Serapion, Dioscorides *and* Pliny *have call'd it* Nitrum, *or* Spuma Nitri, *for the* Latins *so call it; and in the* Pandects *it is affirmed there are two sorts of* Nitrum, *or* Sal Nitri, *viz.* Mineral, *and* Artificial, *of the* Mineral *they say there are four, the* Armenian, African, Roman, *and* Ægyptian. Serapion *says, that the* Minerals *of* Sal Nitre *are as the Minerals of* Salt, *for there are found of it, that are* running waters, *which become congealed and condensed like a stone, and this is affirmed also by* Pliny, *that it is found also in the Mine as a stone, and called* Sal Petrolum; *yea, he says that this* Sal Nitre *is found* White *and* Red, *and of many Colours, insomuch that he affirms that there are many kinds of it, not only for the diver-*

Nitre is mentioned Jeremiah 2. 22. & Prov. 25. 20. although in the Septuagint that last verse is varied, yet Symmachus reads it ὥσπερ ὄξος ἐπὶ νίτρῳ, and St. Hierome follows it, and so does the English translation.

diversity of the colour, but because there is found one that is Spongy, *viz. full of holes, another very fragile, and lamines or plates; and of many other qualities, which would be too long to talk of one by one, of which one is more* biting *and powerful than the other: of the Artificial it is not worth time to speak, it being in these days* better known than Betony.

Truly, I thought the knowledg thereof had been *Modern*. *Prior.*

But tell me, I pray, If the *Antients* had knowledge both of the *Natural* and *Artificial Nitre*, (as you have proved by the Authority of the Antient *Naturalists*) did they also know that it *burns* so vigorously as it does? The 2 Question.

Truly the Antient Naturalists make no mention of it, save only of those proprieties that are found in it necessary to Medicine; but many other Antient Authors *do acquaint us that they knew it burn'd; for they serv'd themselves of it in Compositions of* fire *for to burn the* Testudo, *or* Ram, *and the* Ellepoli, *and other* portable Towers, *which they used in those days in taking of Cities, and also to burn the* Naval *powers: it is true that in such Compositions, some call it by the name of the* Burning Salt, *and others the* Stone Salt, *and* Salt of Skill, *and others by the proper name of* Sal Nitri. Nicol.

Casimirus Semienowicz, thinks that the Antients did seldome or never use *Salt-petre* in their *Fire-works*; and that wheresoever it is found mentioned as an ingredient in the *Ignis Græcus*, &c. and that passage is spurious: at least if it were used, it was kept as a *secret*: for amongst the most renowned Writers of the *Roman* Wars and Militia, ne *jotta* quidem unum in illorum Commentariis de *Sale Nitri*, Nitro, aut *Sale petræ*, quod Romanorum ignibus artificialibus inserviverint, reperiet quispiam. *Art. mag. p. 1. l. 2. c. 1.*

Concerning this I have another doubt, If the Antients knew that *Nitre* burnt with so much force, how comes it to pass that they knew not how to make the *Powder* for *Artigliary*, of so great importance in Art *Military*, as well as we Moderns? *Prior.* The 3 Quest.

The Consequence is not good to say, that if the Antients knew that Sal Nitre *burned, that of necessity they knew how to compound the* Powder; *for that is not made of* Sal Nitre *alone: yea, it is compounded of three Materials, of* Nitre, Sulphur, *and* Coal; *and therefore it is possible they might have the knowledge of* Nitre, *and the Nature of it, and yet be ignorant of the Composition of* Powder. Nicol.

You

Prior. The 4 Queſt.

You have reaſon; But for what cauſe is the *Powder* compounded of thoſe three materials? and what particular office hath every one of them? And what effect ſhall *Two* have without the *Third*?

Nicol.

The Powder is compoſed of theſe three Materials, becauſe each one doth medicate & ſupply the defects of the two *other; for the* Sulphur *is moſt apt to kindle the* Fire *with the flame of either of the other two, which fire with flame is very apt to introduce into fire the* Sal Nitre *more than any other, becauſe the ſaid Nitre burning reſolves it ſelf into a windy Exhalation, the which is ſo potent, that it preſently quenches the flame introduced into the* Sulphur, *and conſequently that introduced (by that of the* Sulphur) *into it ſelf. For the Nature of* Sulphur, *and likewiſe of the* Nitre *is ſuch, that the flame being dead, there remains not the leaſt ſign of fire, and therefore compounding together only* Nitre *and* Sulphur *well beaten, and putting fire to it, immediately it is inflamed and deſtroyed, for the Reaſons aboveſaid, to wit, that ſuch fire will not continue until all the matter be conſumed and burned, but only a little of it, and the reſt will remain not offended by the ſaid fire: therefore to cure this defect, there is mingled with both* Coals *well powdered, becauſe* Coal *is of that Nature, that touched by the flame of fire, it is preſently kindled and converts it ſelf into fire without flame, the which fire without flame the more it is vexed by any* Wind, *ſo much the more it is enkindled and continued, until that all the ſubſtance of it be converted into* Aſhes: *and therefore touching that Compoſition with the fire, immediately the* Sulphur *is taken with flame (as is ſaid) which flame not only introduces preſently fire and flame into the* Nitre, *but alſo in the ſame inſtant introduces fire without flame into the* Coal, *which fire is not extinguiſhed, but rather augmented by the wind, and becauſe that wind cauſed by the* Nitre *is not apt to extinguiſh that fire without flame which is in the* Coal, *yea, rather, as I have ſaid, it augments it, and foraſmuch as the* Sulphur *is contiguous with the fire with flame or without flame, and cannot be without flame, the which flame (as is ſaid)*

in-

So ſaith *Semienowicz.* alſo. Si componeretur corpus quoddam ex Sulphure & ſale Nitri, optime tuſis, & ſimul mixtis, admoto igne, ſubito quidem arriperet flammam, nihilominus tamen ſubito extingueretur, id eſt, ignis ille non continuaretur, perduraretque ad conſumptionem & combuſtionem materiæ totius, ſed pauxillum tantum ex illa conſumeret, reſiduo intacto. *Art. mag. p. 1. l. 2. c. 20.*

inflames the Nitre, *and therefore these three Materials powdered and mingled well together, and fire being put to this mixture, it becomes altogether inextinguishable, until all the substance be consumed: (except there be some accidental defect in some of the materials, either of Humidity, or that there were taken of them much different from the convenient proportion) and therefore it is concluded that the office of the* sulphur *is to take hold of the fire with flame, and to introduce it into the other Materials: and that of the* Coal *is only to maintain the said fire without flame, already introduced by the* sulphur, *and chiefly against that great wind which the* Sal Nitre *causes; but then the office of the* Nitre *is only to cause that great exhalation of wind, for in that wind consists all the vertue and propriety of the Powder, for that it it which drives out the Bullet with so incredible a force, and therefore it is concluded that only on the* Nitre *doth depend all the vertue and puissance of the Powder, and the other two Materials are put therein only to resolve into* fire *and* wind *the said* Nitre, *and for no other end: for he that should compound powder only of* sulphur *and* Coal, *and charge a Gun with a considerable quantity of it, I say, giving fire to it should not be able to drive forth a stick or a straw. And this proceeds because all the expulsive vertue depends solely on the pure* Nitre, *and not of any other thing, and therefore it may be rather concluded p ssible to make Powder without* Coal *and* sulphur, *than without* nitre: *for it is more probable to find other Materials to do the office of* sulphur *in taking fire with flame, and likewise of the* Coal *in maintaining the fire without flame, than to find another which shall be fit to cause so great and impetuous a wind, as the* nitre *does.*

You have well assigned the cause why the powder is composed of those three Materials, and the office every one of them hath in the Composition, now I demand who was the Inventor thereof, and with what reason the proportion of each of the materials was determined by him. *Prior.*

Who was the Inventor of powder *and* Guns, *it is spread amongst the Vulgar by the Authority of* Cornazanus, *who says it was found by chance by a* Dutch Alchymist: *but I am of opinion, that* Archimedes *the* Syracusan, *that famous Philosopher and Mathematician,* Nicol. The 5 Quest.

was the Inventor of the Compoſition, and of the ſame mind is the Commentator of Vitruvius *upon the firſt Book; for of him it is written in many places (as* Vallurius *ſays in his tenth Book* De re Militari) *how he found out a certain Machine of Iron, with which he threw towards a Land Army ſtones of prodigious weight and greatneſs, and with an incredible ſound; which gives us to underſtand that it was a Machine like a great* Gun, *with which he threw great Balls of ſtone (as it is not long ago, ſince the Moderns did,) and chiefly for their* great ſound, *which in diſcharging them happens, and in any other kind of Machine it does not appear to me it could be done except in one like it. True it is, that at that time it is probable they were more deformed and unhandſome than thoſe uſed at this preſent time; for the firſt Inventions are always ſomething homely, but mend with time, it being an eaſie matter to add to things already found out; and the ſame thing I ſay of* powder *which in the beginning was found out (either by* Archimedes, *or by whom you will) but was not compounded in ſuch order and proportion as at preſent is uſed. Yea, I rather judge that from that time until this, the Compoſition hath been varied many ways, and that this is true I have found in ſome Book not very Antient certain ways and Orders of compoſing it much differing from the preſent, the variety whereof I ſhall here diſtinctly ſet down:*

1 Gun-powder of the moſt antient way.

Sal Nitre	}	Each equal parts.
Sulphur		
Coal.		

2 Powder not ſo antient.

Sal Nitre	}	3 parts
Sulphur		2 parts
Coal		2 parts

3 Powder not ſo antient.

Sal Nitre	}	10 parts
Sulphur		3 parts
Coal		3 parts

Powder

4 Powder not ſo antient

Sal Nitre	12	parts
Sulphur	3	parts
Coal	2	parts

5 Powder not yet ſo antient.

Nitre	9	
Sulphur	2	parts
Coal	3	

6 Powder of the Moderns.

Nitre	4	
Sulphur	1	parts
Coal	1	

7 Powder more Modern.

Nitre	20	
Sulphur	3	parts
Coal	10	

8 Powder more Modern.

Nitre	100	
Sulphur	10	parts
Coal	36	

9 Powder Great after the Moderns.

Nitre	100	
Sulphur	20	parts
Coal	37	

10 Fine powder not very antient.

Nitre	9	
Sulphur	3	parts
*Coal of * Mirochea*	6	

11 Great Powder more modern.

Nitre	2	
Sulphur	1	parts
Coal of willow	1	

12 Powder of Harquebuſes more Modern.

Nitre	3	
Sulphur	1	parts
Coals of branches of young willows.	1	

13 Fine powder more modern.

Nitre refined many times	5	
Sulphur	1	par.
*Coal of the twigs of young * Hazel*	1	

* Avelane.

14 Great powder more modern.

Nitre refined	3	
Sulphur	1	p.
Coal of Willow.	2	

15 Middle powder more modern.

Nitre refined	10	
Sulphur	2	p.
Coal of Willow	3	

16 Powder of Harquebuſes modern.

Nitre refined many times	10	
Sulphur	1	p.
*Coal of * the tender branches of the Filberd or Hazel cleanſed,*	1	

* The Author confeſſes he knows not what Mirochea is.

* Verzelle. Nizola is a filberd or a hazel Probably, Verzelle may be the ſhell of the Nut, but I cannot find it.

17 Gun-Powder more modern.

Nitre refined	27	
Sulphur	3	p.
Coal of the tender branches of the filberd or Hazel cleanſed.	4	

18 Gun-powder more ſtrong and modern.

Nitre refined	7	
Sulphur	1	
Coal as laſt before	1	

* Nizolaro. 19 Piſtol powder more fine and ſtrong.

Nitre many times refined	6	
Sulphur	1	parts.
Coal as before of Hazels, or Filberds	1	

20 Great powder modern.

Nitre	4	
Sulphur	1	p.
Coal of Willow	1	

21 Great powder modern.

Nitre	20	
Sulphur	4	p.
Coal of Willow.	5	

22 Piſtol Powder modern.

Nitre refined the dry way	48	
Yellow Sulphur	7	parts.
* *Coals of filberd or Hazel, or Hempe-ſtalkes dryed.*	8	

23 Piſtol powder modern.

Nitre refined	18	
Sulphur	2	p.
Coal of Filberd wood	3	

Now to make any of the aforeſaid Powders, *it is neceſſary to take notice that the* nitre *be pure and potent; the which is known by the practices by burning a little; likewiſe that the* ſulphur *be clear from the earth and other filth, and that the Coal be not moiſt by ſtanding in a moiſt place, and that it be not mixt with Duſt or Earth; Laſtly, that it be well beaten, and the materials be well incorporated together: and making ſuch* powder *it will not want effects anſwerable to the kinds of it, not forgetting that it be well dried, and kept in a dry place.*

Prior. Certainly there is reaſon to wonder at the various change of the pro[illegible]ions, and I cannot wonder, what ſhould lead them ſo to determine them.

Nicol. *The firſt Invention (ſome believe it was by chance) I am well ſatiſ-*

ſatisfied was found by reaſon ſpeculatively; *to wit, that theſe three Materials well beaten and mingled together ſhould be apt to make a fire ſo ſtrong and unquenchable, until each matter ſhould be conſumed, for there are clear reaſons that it ought to be ſo, but to give the proportions of the ſaid Materials, I believe they were adviſed by* Experience; *for the firſt Order was founded upon Equality, for they took alike of each, but although it might have a good effect, nevertheleſs perceiving that effect proceeded from the* nitre, *they took a greater quantity than of each of the other, and they found that Powder more potent than the firſt, and ſo with rational advice ſome have varied the order unto this day: True it is, there are ſome orders of the afore-noted that have been ordained with* little Reaſon, *and leſs judgment; yea, I believe ſome of them, (becauſe they would not do what was done before) to ſhew their wit without any other reaſon have made new Inventions,* viz. *increaſing the* Coal *and diminiſhing the* ſulphur, *&* vice verſa, *others varying all three in ſuch ſtrange proportions that it might appear* found out *with greater* prudence *and ſubtilty.*

There are indeed a certain ſort of *Inventors* who knowing not how to ſpeak or do, but what hath been ſeen or done already by others, and are aſhamed that it ſhould appear that they have leran'd or taken any thing from thoſe went before them, do force themſelves to vary ſomething from the former manner, or the ſpeech, though it be to make it worſe than it was before.

Prior. And Tartaglia was very ſenſible that ſome of his Inventions would be invented over again.

It is a ſad truth indeed. Nicol.

You have ſhewed me how the *Order* and *Proportion* of the three materials, have been varied from time to time, now I deſire to know which of the afore-mentioned Orders you eſteem to be the beſt, that is, the moſt perfect and potent Powder?

Prior. The 1. Queſt.

Doubt.

Nicol. *Doubtleſs that which contains the greater quantity of* nitre, *I ſay that the greater in reſpect of the whole, therefore that of the* 16 th. *Order ſhall be more potent than any of the reſt,* viz. *that thus compoſed,*

Thus in the Original.

Sal nitrio raffinato piu volte	}	10 *parts.*
Solfere	}	1 *part.*
Carbon de Verzelle de nizola giorene e monde	}	1 *part.*

Nitre refined many times	}	10
Sulphur	}	1 parts.
Cole of the tender branches of the Hazle or filberd young & clear.	}	1

and this ſhall be the moſt powerful for two Reaſons: the firſt is, becauſe it doth contain five ſixths of Nitre, *the which five ſixths is greater than that in any other part occurring in any of the above ſpecified Orders. The ſecond is, becauſe the* Nitre *is refined* many times, *which makes it more perfect: and there is in it alſo more perfect* Coal; *for if the* Coal *be made of a* light *and* ſoft matter, *it is more apt to receive, and more falſely to maintain the fire, and ſo ſhall be more fit and diſpoſed to do the office with celerity.*

Prior. The 7 Queſt. You have concluded the 16 *th.* Order to be the beſt powder, but I demand, if yet it ſhall not be more potent that ſhall receive a greater part, than five ſixths of *Nitre,* and a leſſer by one ſixth between the *ſulphur* and the *Coal?*

Nicol. *Without doubt it ſhall, provided that, that little part of the* ſulphur *and* Coal *be but ſufficient to do its office, which is diſcovered by taking fire with ſpeed, and alſo by introducing and maintaining it in the* Nitre *until it be wholly reſolved into fire, for if there be ſo little quantity of the* ſulphur *and* Coal *as not to do its duty, that compoſition ſhall be but unuſeful and of no value: and therefore it will behoove one to take good heed, for if it were poſſible to make good* powder *of pure* Nitre, *it would be the beſt and moſt powerful of all, but becauſe it is not apt alone to take fire with that celerity with quick flame as does the* ſulphur, *nor to conſerve it till it is all conſumed, as does the* Coal, *therefore it is neceſſary to give it the company of the*

the other two, and in such a quantity as may be apt and sufficient to do as it ought, which may be discovered, as I told you before.

I understand you well, but is this rule general for all kind of *Artigliery*? for it is well known, that *Pistols* require finer powder than *Arquebusus*, *Arquibusus* finer than *Musquets* and *Falconets*; and *Falconets* better than other sorts of great *Artillery*: and therefore I demand whether it be not necessary to limit this composition, and fineſs according to the sorts of the *Pieces*? *Prior.* The 8 Question.

It doth appear to me so, although it be the custome, yea I have an opinion it is an error as that about your Cannon *in the* XI *Quest. of the first Book, about the length of Guns, quantity of Powder and weight of Bullets,* &c. *but I will consider better of it and make you sensible of the error in that thing.* Nicol.

☞ Of the same opinion with *Tartaglia* in this last point doth *Vannuccio Biringoccio* seem to be, in that he thus expresseth himself. *The great Artillery does require other Powder than the small, as the Gunners are pleased to say.* But the common *Experience*, as well as the authority of *Casimirus Simienowicz*, doth shew that the large-grained powder, called *Cannon-powder* is not so serviceable for *small pieces*, as that which is *less*, and in *smaller grains*. Though whether the *smaller-grained powder* be not more effectual in *Cannons*, than what is commonly used, I know not. certain it is that the *lesser* the *grains* are, the more *powerful* is the *Powder*: and yet, if the powder be not *grenulated* at all, but in a *subtile powder*, it loseth its efficacie, and will scarce throw the Bullet beyond the mussel of the *Gun*. These and other *curiosities* (many of which are touched upon by that learned *Lithuanian*, & by *Kircherus*, our *Virtuosi* might have taken notice of, rather than have digressed into those *impertinencies* with which he concludes his discourse of *Salt-petre*. Neither have I time to inlarge upon this Subject: nor is it my intention to carry this *animadversion* further, than to demonstrate to the meanest capacity, how ill some have written upon so *noble*, so *common*, and so necessary a Subject: and wherein they had such excellent *helps* from the *writings* of *others*, had not their *ignorance* bereaved them of those aids.

F I N I S.

An additional Review.

TO the end that no exceptions may be taken against what I say in relation to the *English Liturgy* by any of the *Episcopal* Clergy on the one hand; or that the *Non-Conformists* may not derive any *further prejudice* against the *publique* and *established* Worship in this Nation: I do profess that I neither do hereby any way derogate from the *Liturgy* of the Church of *England*, neither do I think any man can justly condemn Queen *Elizabeth* for the course *She* took herein, but rather commend her most *pious* prudence; what I say, is agreeable to what sundry *English* Writers say, that justifie the *equitableness* of our *penal Laws* against the *Papists*; it is conformable to what Dr. *Heylin* writes in his History of the Reformation *primo Elizabethæ*, and the words of Mr. *Hales* in his Sermon preached at *Pauls*-Cross are these:

Mr. Hale's Sermons, pag. 57, 58.

'And here I may not pass by that *singular moderation of this* 'Church of ours, which she most Christianly expresst towards 'her Adversaries of *Rome*, here at home in her bosome above 'all the Reformed Churches, I have read of; for out of desire to 'make the breach seem no greater, than indeed it is, and to 'hold Communion and Christian fellowship with her so far 'as we possibly can, we have done nothing to cut off the fa-'vourers of that Church. The reasons of their love and re-'spects to the Church of *Rome* we wish, but we do not com-'mand them to lay down: their Lay-Brethren have all 'means of instruction offered them. Our *Edicts* and *Statutes* 'made for their restraint, are such as serve only to awake 'them, and cause them to consider the *innocencie* of that cause 'for *refusal of Communion*, in which they endure as (they 'suppose) such great losses. Those who are sent over by *them*, 'either for the retaining of the already perverted, or preven-'ting others, are either return'd by *us* back again to *them*, or 'without any wrong unto their persons, or danger of their 'lives, suffer an easie restraint, which only hinders them from

disperſing

'disperſing the poyſon they brought. And had *they* not been 'ſtickling in our *State-buſineſs*, and medling with our *Prince's* 'Crown, there had not a drop of *their Blood* fallen to the 'ground: unto our Sermons, in which the warnings of *that* 'Church are *neceſſarily* to be taxed by *us*, we do not bind their 'preſence, *only* our deſire is that they would joyn with *us* in 'thoſe *prayers* and *holy Ceremonies* which are *common to them and* 'us. And ſo accordingly, by ſingular diſcretion was our *Ser-* 'vice-Book compiled by our *Fore-Fathers*, as containing no- 'thing that might offend *them*, as being *almoſt* meerly a *Com-* 'pendium of their own *Breviary* and *Miſſal*, ſo that *they* ſhall 'ſee *nothing* in *our Meetings*, but that they ſhall ſee done in 'their own, though many things which are in *theirs*, here I 'grant they ſhall not finde. And here indeed is the great and 'main difference betwixt *us*: As it is in the Controverſie con- 'cerning the *Canonical Books of Scripture*: whatſoever we hold 'for *Scripture*, that even by *that Church* is maintained, only *She* 'takes upon *her* to add much, which we cannot think ſafe to 'admit: ſo fares it in other points of Faith, and *Ceremony*; 'whatſoever it is *we* hold for *Faith*, ſhe holds it as far forth 'as *we*: our *Ceremonies* are taken from *Her*; only *She* over 'and above urges ſome things for *Faith*, which *we* take to be 'Error, or at beſt but opinion, and for *Ceremony* which *we* think 'to be *ſuperſtition*. So that to participate with *us*, is, though 'not throughout, yet *in ſome good meaſure to participate with* 'that Church: and certainly were that Spirit of *Charity* ſtir- 'ring in *them*, which ought to be, they would love and honor 'us, even for the *reſemblance of that Church*, the beauty of which 'themſelves ſo much admire. Thus far Mr. *Hales*, with whoſe ſentiments my thoughts ſo correſpond, that to juſtifie the pro- cedure of that renowned *Queen*, I add that *Her* action is war- ranted by the deportment of the *Chriſtians* from the *Apoſtolique* and *primitive* times, to the revolution under *Conſtantine*, and that I never read any thing in *Eccleſiaſtical Hiſtory* relating to *Chriſtianity*, to convince me that *Her demeanor* therein was *un- lawful*, or *unexpedient*.

Where I ſpeak of the Sweating-Sickneſs, to the accounts of

Polydore Virgil and *Hollingshed*, add this out of the Chronicle of *Edw. Hall* published by *Richard Grafton Anno Domini* 1550.

In the first year of King Henry 7. *a new kind of Sickness came suddenly through the whole Region, even after the first entring of the King into this Isle, which was so sore and painful and sharp, that the like was never heard of to any mans remembrance before that time: For suddenly a deadly and burning Sweat invaded their bodies, and vexed their blood with a most ardent heat, infested the stomach and the head grievously: by the tormenting and vexation of which sickness, men were so sorely handled & so painfully pangued, that if they were laid in their bed, being not able to suffer the importunate heat, they cast away the sheets and all the cloaths lying on the bed. If they were in their apparel and vestures, they would put off all their Garments, even to their shirts. Others were so dry that they drank the cold water to quench their importune heat and insatiable thirst. Others that could or at the least would abide the heat and stench (for indeed the Sweat had a great and strong savour) caused cloathes to be laid upon them as much as they could bear, to drive out the Sweat, if it might be. All in manner assoon as the Sweat took them, or within a short space after, yielded up their Ghost. So that of all them that sickned, there was not one amongst an hundred that escaped: Insomuch that beside the great number which deceased within the City of* London, *two Mayors successively died of the same disease within eight days, and six Aldermen. And when any person had fully and compleatly sweat 24 hours (for so long did the strength of this plague hold them) he should be then clearly delivered of his disease: yet not so clear rid of that, but that he might shortly relapse and fall again into the same evil yea again and twice again, as many one in deed did, which after the third time died of the same. At the length by Study of Physitians and experience of the people, driven thereunto by dreadful necessity, there was a remedy invented: For they that survived, considering the extremity of the pain in them that deceased, devised by things meet contrariant, to resist and withstand the furious rage of that burning furnace, by luke-warm drink, temperate heat, and measurable cloathes. For such persons as relapsed again into the flame after the first deliverance,*

verance, obſerved diligently and marked ſuch things as did them eaſe and comfort at their firſt vexation, and uſing the ſame for a remedy and medicine of their pain, adding ever ſomewhat thereto that was ſanative and wholſome. So that if any perſon ever after fell ſick again, he obſerving the regiment that amongſt the people was deviſed could ſhortly help himſelf, and eaſily temper and avoid the ſtrength and malice of the Sweat. So that after the great loſs of many men, they learned a preſent and ſpeedy remedy for the ſame diſeaſe and malady, the which is this: If a man on the day time were plagued with the Sweat, then he ſhould ſtrait lie down with all his cloathes and garments, and lie ſtill the whole 24 hours. If in the night he were taken, then he ſhould not riſe out of his bed for the ſpace of 24 hours, & ſo caſt the cloathes off that he might in no wiſe provoke the ſweat, but ſo lie temperately that the water might diſtil out ſoftly of its own accord, and to abſtain from all meat if he might ſo long ſuſtain and ſuffer hunger, and to take no more drink neither hot nor cold, than will moderately quench and delay his thirſty appetite. And in this his amending, one point diligently above all other is to be obſerved and attended, that he never put his hand or foot out of the bed to refreſh or cool himſelf, the which to do is no leſs pain than ſhort death. So you may plainly ſee what remedy was by the dayly experience excogitated and invented for this ſtrange and unknown Diſeaſe, the which at th at time vexed and grieved only the Realm of England *in every Town and Village, as it did divers times after: but 55 years after, it ſailed into* Flanders *and* Germany, *where it deſtroyed people innumerable for lack of knowledge of the Engliſh experience.*

In the twenty ſecond year of the aforeſaid King, though the Sweating-Sickneſs did break out again, yet he ſaith that it did leſs hurt and diſpleaſure to the people at this time, than it did before, by reaſon of the remedy which was invented by the death of many a Creature in the beginning. But in the ſubſequent years the Sweating-ſickneſs is repreſented by him to be as direful, as others relate of it. But neither doth *Hall*, or any other *Chronologer* ſpeak of this *famous* and *almoſt infallible Medicine*, what effect it had: ſo that we may *conclude*, that ſince it was *impoſſible* for the people to have been *ignorant* of

that *remedy* during thoſe latter *mortalities*, the *courſe* it felf muſt needs have been *ineffectual*.

Whereas I obſerve that the *Arcanum* of *Ivy-berryes* was no ſecret, however that Arcaniſt pretended it to be ſo; I prove it out of *Alexius Piedmontius* and others: I add to thoſe Authors *Parkenſon*'s Herbal, a Book called, *A thouſand Notable things*: and *Simon Paulli* profeſſeth he was taught it by a *Scotch* Soldier. And that it may appear with how much *more accurateneſs* the receipt is in our Medicinal Books, than in the account of Mr. *R. B.* I ſhall ſet down the words of *Alexius Piedmontius*; and that the rather, becauſe if the Receipt were ſo effectual as 'tis repreſented, (as I am ſatisfied it hath been at other times) 'tis neceſſary men ſhould know how to uſe it.

Alexius Piedmontius Secret. l. 2. pag. 92. ex verſ. Latin. Wickeri Baſilea 1563. 'Præſentiſſimum remedium ad eos, qui 'Peſte correpti ſunt; quod valet etiam ad lividas puſtulas in 'cute ex febre peſtilentiali ſubortas: itemque ad carbunculos, 'ignem ſacrum, & id genus alia.

'R. Hederæ baccas, maturas, & in umbra ſiccatas, deinde 'contritas, & fiat pulvis, de quo accipiant ægri ʒ ſß. cum po- 'culo dimidio vini albi, deinde maneant in lecto, ut optime 'ſudent. Poſteaquam ſudaverint ægri, induſium, linteamina 'lecti, & ſtragula mutentur, ſiquidem fieri poteſt: ſin minus, 'induſium tantum cum linteaminibus. Atque ſic aliqui una 'nocte ſola ſani evaſerunt. *Mediolanenſem* quendam vidi ipſe 'Aleppæ, correptum peſte, una cum bubone in inguinibus & 'ſub axilla altero, qui cum hoc pulvere bis in die, mane ſcilicet '& veſperi uteretur: ſequenti die, bubonibus ruptis con- 'valuiſſe.

The old MSS. *Receipts* to which I refer (there is a miſtake in the year of that *Plague* in the *Print*, it being 1525. not 1540.) *Give as much as will lie on a ſix-penke (or more) in half a glaſs of white wine, and direct to cover the party well and make him ſweat*: and they add, *That ſome have taken of the ſaid powder over night, and found themſelves in the morning ſo well, that they have roſe up, cloathed themſelves, and walked about the houſe,*

house, and finally been throughly cured. Probat. Ann. Domini 1625.

* The *Treasure for English men*, or Receipts published in *Th. Vicary* (pag. 245.) *Give a dram of the said powder tempered with* two ounces of Planten-water, *or white wine*: and *direct the Patient to sweat upon it as much, and as often as he can: and in using this for three or four days together, he will die or mend without all doubt (by Gods help.)* This hath been often and truly proved. The Author of *A thousand Notable things* gives only *half a dram* with two or three ounces of *Planten-water*, and directs them to sweat, as *Alexius* doth.

Mr. *Parkinson* from the *Empericks, Quacksalvers*, and *Chirurgions*, expresseth not the dose nor circumstances with which it is given; but that it must be taken 2 or 3 days together. *R. B.* Of the usefulness of Nat. Phil. par. 2. pag. 142.

Thus they, whereas Mr. *R. B.* says only that in the *Irish* Plague, the *Arcanum* which cured such numbers (and which he purchased by the *exchange* of another *Secret*) was *only a good dose of the powder of fully-ripe Ivy-berryes, which did usually work plentifully by sweat.* Here is neither an account of the *Type*, or *quality of that Plague*; (yet there is a great difference betwixt *one* and *another*, howbeit they go under *one name*: nor are they cured by one method.) No relation of the *dose of the powder*, whether *half a dram, one, two*, or *three drams*: yet in the *plague* such *fudorifiques* as are otherwise used, are given in *double quantity* to what is commonly practised in *lesser exigencies*: and though it be said to *work plentifully by sweat*; yet is there no directions that the *patient be laid to sweat*; but, for all this saying, it might induce one that knew no more than this about *Arcanum*, to advise it *only* as such *powders* are given frequently to continue (with other Medicines) plain *transpiration insensibly*. In sum, there is not set down whether that our *Irish* Physician did begin his *Cure* with this *powder*, or with what *Method* he used it: and when all these *Circumstances* are added, (without which the *Receipt* is *useless*) though I am pleased to have read the *happy* success of it *once*, yet I dare not *promise* that it shall *again*, any more than Mr. *Sprats* almost *infallible cure of the Sweating-sickness*, or those other *Anti-Pestilential Medicaments* (now *exactly*) recorded by *Experimental Galenists*.

Whereas (*pag.* 54.) I speak of the age of *Geber*, as following

ing of *Leo Afer* in my judgment, and that he lived but one hundred years after *Mahomet*: and consequently many Centuries before *Raymund Lully*: the Argument I use is manifest to any man that knows the time of the birth of *Mahomet*, (which yet *Historians* fix to be, some *A. D.* 570. others *A. D.* 610. others in 620.) and that the *Hegyra* begins *A. D.* 622. as *Vossius*. But I think it fit that I observe here that as in all the *Arabian* Chronology, so in this particular about the age of *Geber*, there are great uncertainties. *Blancanus* placeth *Geber* (the *Arabian*) in the ninth Century after *Christ*; and so he must have lived about five hundred years before *Raymund Lully*, The inquisitive and learned *Libavius* reckons upon *Geber* as contemporary with *Mahomet*, saying, *Geberus quem volunt circa annum partûs virginei sexcentesimum in vivis fuisse.* I find that *Vigner* placeth him in the year of our Lord 723. *Ricciolus* calls him a Spaniard, *Geber Hispalensis* in his Chronicle of *Astronomers*, he placeth him in the year of our Lord 1090. and gives this reason against *Blancanus*, that it must be so, because that *Geber* in his *Astronomie* mentions *Arzachel* who lived in the *twelfth Century* after Christ, and whom by the name of *Arzael* is placed by *Blancanus* two Centuries after *Geber*, that is, within the *eleventh* Century after *Christ*. There is such a confusion in the *Arabian* names, that I am ready to imagine there were two *Gebers* (or more, the name being commonly assumed by the *Saracens*) the one *very* antient, and a *Chymist*, of whom *Leo Afer* may speak; and another in *Spain*, famous for *Astronomy*, who corrected sundry things in *Ptolomy's Almagest*, of whom *Ricciolus* and others speak, who call *Geber* a *Spaniard*. As for *Raymund Lully*, whom Mr. *Henshaw* placeth in the year 1333. I find *Libavius* to say he flourished sooner: *Illustris fuit Reimundus anno salvatoris* 1324. but *Conringius* relates how he was killed in the year 1315. *Lullius* 1315. *Octogenarius circiter, dum religionem Christianam Bugiæ in Africa doceret Martyr lapidibus obrutus est.* From whence it is manifest, that if we place *Geber* in the *twelfth* Century with *Arzachel*, (as *Ricciolus* in his larger and *more accurate* Chronicle doth) then

See Hottinger Histor. Orient.

Blancanus Chronolog. Mathemat. Secul. 18.

Andr. Libavius exam. cens. Parisiens. Vide Naudæum in histor. Magiæ. c. 14. Vide *Riccioli* Chronicon utrumque præmissum Almagesto novo.

Andr. Libavius exam. cens. Parisiens. Conring. de medic. *Hermet.* c. 27. pag. 389.

then it is a miſtake in Mr. *Henſhaw* to ſay that *Geber* for *certain* flouriſhed *ſome Centuries* before *Raymundus Lullius* : and it *ſeems* evident that he miſtook the Age of *Lullius* alſo. So that if I grant *him* to have been a *Spaniard* (as I do not grant that *Geber* the *Chymiſt* was either a *Spaniard*, nor yet an *Indian* King, as ſome have thought) I have ſtill *juſt reaſon* to except againſt Mr. *Henſhaw*.

Where I ſay there are different *Salt-Petres*, perhaps according to the ſeveral Earths they are made : and to what I ſay about the *Salt-Petre* gathered of *Lime walls* ; add, that ſince the writing hereof I have been where a *new Cellar* yeelded me a quantity of *Peter* on the walls : I obſerved that the taſte was rather like the *ſalt* of *calx viva*, than of *Nitre*, yet did it burn without leaving any *fixed ſalt* at all. So that if Mr. *Henſhaw*'s friend had minded that, perhaps there might have been a conſiderable improvement deduced thence, either in order to *Phyſick*, or the Manufacture of *Gunpowder*.

FINIS.

THe favorable Cenſure of the *Reader* is craved for what *Errors* have happ'ned in Printing, which the Authors leiſure hath neither permitted him to prevent nor correct: However I am to deſire that theſe two may be thus read, *viz.* In the 2 Pag. of the *Dedication*, *line* the 11. for (*your Supporters*) read (*their Supporters*) and *pag.* 105. *lin. ult.* read *Libavius.*

N. H.

Legends no Histories:

OR, A

SPECIMEN

Of some

ANIMADVERSIONS

Upon the *HISTORY* of the

Royal Society.

Wherein, besides the several Errors against Common Literature, sundry mistakes about the making of *Salt-Petre* and *Gun-Powder* are detected, and rectified: whereunto are added two Discourses, one of *Pietro Sardi*, and another of *Nicolas Tartaglia* relating to *that Subject*. Translated out of *Italian*.

WITH

A brief Account of those passages of the *Authors Life*, which the *Virtuosi* intended most to censure, and expatiate upon: Written to save them the trouble of doing any thing besides *defending themselves*.

TOGETHER

With the PLUS ULTRA of Mr. *Joseph Glanvill* reduced to a NON-PLUS, *&c.*

BY

Henry Stubbe, Physician at *Warwick*.

At vos interea venite ad ignem
Annales Volusi, cacata charta. Catullus.

Printed at *London*, and are to be sold by the Book-sellers there. 1670.

The Preface to the Judicious

READER.

IT may perhaps, and that not *unjustly*, be wondered, that I should appear in behalf of the *Antient* and *Aristotelian* Philosophy, who have always been thought averse from *it*, and inclined to that which is more *Novel*. And it is true, that I have not such a *veneration* for the *Peripatetical Physicks*, as some others have, nor do I think *they* so *satisfactorily* explicate the *Phœnomena* in *sublunary* things, as that an inquisitive brain can *acquiesce* therein: but this is not so much the *deficiency* of *that Learning*, as of *humane Nature*; the attempt it self being so *little feasible*, that *whosoever* shall design *any such thing*, shall involve himself in the *like miscarriages*, as appears from what *Gassendus*, *Des Cartes* and others have done, from whose performances the *greatest* advantages we have yet derived is, that it seems manifest how *easie a thing* it is to find *defaults*, and how *difficult* to amend *them*; and how the *Man* of *Stagira* was not *singular* in his *faylors*.

If the *Cartesian* Hypothesis seem to be *demonstrated sufficiently* in *this*, that it is agreeable to the *general occurrents of Nature*, and solves the *difficulties* emergent, as if it were absolutely *true*: If this, I say, may pass for *sufficient proof*, I know not why a *Physician* may not submit unto the *like conviction*, who dayly *experiments* that the *Aristotelian* Philosophy (which with some little *discrepancie of opinions*, and *diversity of explications* hath been transmitted from the *Asclepiade*, *Hippocrates*,

How false that *Cartesian* assertion is, the learned and pious Dr. *More* hath in sundry pieces demonstrated. *Anton. vande Linden* de circuitu sanguin. l. 2. q. 17.

Exercit. 9. Sect. 221. *Hieron. Mercurialis* de hom. generat. c. 2. *Andr. Laurent.* anatom.

and

and *Arabick* to their *Alchymick*, *Greek*, *Sarracenical*, and *Christian* Physitians through so many *ages*, *revolutions*, and different *Climates*) is most conformable to the *Subject* about which his *Faculty* is employed, the *explanation of Diseases*, *their Nature*, *their Symptoms*, *their tendency*, and *Cure*? Not only the *Chyrurgical*, but *Medicinal* part of *Physick* hath been carried on and *stated* upon those *general grounds*, and that with such *assurance*, that where any *learned* and *solid practitioner* of *that way* shall happen to be *at a loss*, those which are *enemies* to it, the admirers of the *Virtuosi* and of *Odowde*, have not been able to make any *considerable* advantage *thereby*. Most that the *Novellists* have done, is to find out *new reasons* for an *antient practice*, and to shew how the old *Medicaments* wrought to *their effects* in *another way* than was supposed: but they have neither discredited the *Medicines*, nor *Method* with any *understanding* men: Whatever *superlative discoveries* have been made of late, a short *time* and *tryal* hath convinced *us* of the *inutility* of the most famed *inventions* and *Theorems*; and the *tedious*, *costly*, *new Medicaments* have scarce continued to be *nine days wonder*. I speak not this out of *contradiction* I carry to these *Virtuosi*; it is the result of my thoughts after twelve years of *deliberation*, after *observations accurately made* in my *own practice*, and in that of other *antient* men: and as it is *known* how I never desired any thing so much as the *benefit of my Patients*; so I hope I may be believed when I protest that my *Ambition* and *Interest* both suggested unto *me* a desire of *atchieving Miracles in Physick*, if it had been *possible*. But, since whatever *repute* I have required I owe it to that *Physick* which hath descended down unto *this age* by the means of such as have been of the *Aristotelian* and *Galenical* way, I am but *just* unto those *Worthies* in thus declaring against their *puny Adversaries*, who deserve all that *contempt* wherewith we *depreciate* the *illiterate* and *fools*, when they tell us that the *Antient Method* will not qualifie *us* to *work*, or enable us TO CURE A CUT FINGER, may less discover the *nature*, and *course* of *Diseases*, the *operation of Druggs*, and the *right compounding of them* for the benefit of the *sick*.

Mr. *Glanvil* in his plus ultra pag. 7.

Mr. *Sprat*, pag. 117. and 327.

Although

Although that this Reason might sufficiently justifie me for what I have done, yet I had more powerful *inducements* which pressed me unto this design; and those are the *exigences* of the *English Monarchy*; whereunto since the *good Providence* of *God* hath subjected us once again, it is the *prudence* of every particular person to contribute all he can to the support of it, against all such intendments as may either introduce *Popery* on the one side, (which renders the *Title* of our *King*, and his *power* precarious, and will subvert the whole *Commonalty* of *England* in their *Estates*, not to mention the *concern of our Souls*, and that *intellectual slavery* whereto we must submit) and against all *Anarchical projects*, or *Democratical* contrivances, whereof a *debauched* and *ungenerous* Nation is not capable, and which cannot take effect without such *variety of changes*, as no *sober* man will think upon without *horror*, nor any that is *wise* pursue as *feasible*. I do avow therefore that the *desire* I had to contribute what I could to uphold the *Fundamental Policy* of these *Kingdoms*, was the principal *motive* I had to write this Treatise: and that how *willing* soever I was otherwise to discharge all *intelligent* persons from the *insupportable* prating of these *Comical wits*, and to avenge *my own faculty* upon these *insolents*, yet the *circumstances* which I saw might create me *future troubles* and vexations were such, that nothing less than a *generous* and *necessary inclination to serve my Countrey* could have made me *despise them*. I have so *small a regard* for deep and subtle inquiries into *Natural Philosophy*, and the *intricate Mechanismes* by which *this World* is *said* to be governed, that could *Physick* be unconcerned in *their debates*, could *Religion* remain *unshaken* amidst the writings of these *Vertuosi*, could that *Education* be carried on happily whereby the *Subjects* are qualified to serve their *Prince* in all *Negotiations* and *Employments*, and their *Countrey* in *Parliament*, I should not entermeddle: but, if we look

Whosoever would be satisfied about the *imprudence*, *vanity*, and *perniciousness* of all attempts to subvert the *Monarchy* of *England* now, and introduce a *Democracy*; I would advise him to read over the Political discourses of *Malvezzi* in *Tacitus*, disc. 3. *Boccalini* advert. cent. 2. advert. 30. *Paolo Paruta* disc. polit. c. 8. *Chr. Forstner*, in *Tacit.* l. 1. p. 3,4,5,6. Ut verissime dixerit *Cosmus Medices* Cardinali *Salviato*, in tanta opum inæqualitate, morumque corruptione, *Florentinam* Rempub. non esse amplius *libertatis* capacem, quæ optari potius quam sperari debeat. *The reasons why the last* Brutus *miscarried in his design, will convince any man.*

look *de facto* upon these *Experimental Philosophers*, and from too *fatal tryals* judge how little *they* are fitted for *those trusts* and *management of busines* by that so famed *Mechanical Education*: and if we consider how much this Nation owes to *Burleigh*, *Walsingham*, *Jewel*, *Abbot*, *Perkins*, *Whitaker*, *Usher*, *Davenant*, *Casaubon*, &c. & that by complying with these *Novel projects* for the breeding up of *Youth*, we deprive our selves of all *our hopes* to see *such persons* either in *Church* or *State*; we must rise as high in our *resentments* against the *Authors of this History*, & Mr. *Glanvils* Book (where more than *one* or *two Virtuosi* that contributed unto it) as the *concerns* of the *present Age* and of *our posterity* can animate *us*. That *Art of reasoning* by which the *prudent* are discriminated from *fools*, which *methodizeth* and *facilitates our discourses*, which informs us of the *validity of Consequences*, and the *probability of Arguments*, and manifests the *fallacies of Impostors* and *Comical Wits*; that *Art* which gives *life* to *solid Eloquence*, and which renders *States men*, *Divines*, *Physicians* and *Lawyers* accomplished, how is this *cried down* and *vilified* by the *Ignoramus*'s of these days? What *contempt* is there raised upon the *disputative Ethicks* of *Aristotle*, and the *Stoiques*? And those *Moral* instructions which have produced the *Alexanders* and the *Ptolomeys*, the *Pompeys* and the *Ciceroes*, are now slighted in comparison of *day-labouring*! Did we live at *Sparta*, where the dayly imployments were the *exercises of substantial vertue* and *Gallantry*, and *men*, like *setting-dogs*, were rather *bred up unto* than *taught reason* & worth, it were a more *tolerable propos'al* (though the *different policy* of *these times* would not admit it) but this *working* so recommended is but the *feeding of Carps in the Ayr*, the *weighing of a pike in water*, the *cooling of Wine with Sal Armoniac*, (published long ago by *Berigiardus*), the *guilt varnish* (no *secret* to some *Trades-men* in *London*) or the inventing of an *Ambling-saddle*. As for the study of *Politicks*, and all *Critical Learning* together with *Church-History*, these are either *pedantical*, or *tedious* to those who have a shorter way of *studying Men*? Those *Metaphysicks* which the *constant policy of Christendom* hath found so advantageous, that without a *Miracle* we could not have born up against the *Heathen-Philosophers*, *Arrians*, *Sarracens*, and *Socinians*,

Mr. Sprat. pag. 324.

See Mr. Glanvill's plus ultra pag. 123. & pag. 118, 119.

Mr. Sprat pag. 341, 342.

Mr. Sprat pag. 326.

means, and out of which we do so confound the *Papists*, these must be *laid aside*; and are we not then in a fit posture to encounter *Bellarmine*, and *Baronius*? I remit these things to the consideration of all *serious patriots*, and do earnestly desire that they would with attention read over *Campanella* concerning the *Spanish* Monarchy, *Ch.* 23. *pag.* 142. *ch.* 25. *pag.* 157. *ch.* 27. *pag.* 177, 182. and the last part of the *History of the Royal Society*; and maturely *whether* the *projects* of the *one* be not put in execution by the *other*.

I doubt not but *this attempt* of *theirs* was *no part of the intentions of* their *Royal Founder*: I am sure the *publique utility* is more dear unto *Him* than the giving of some men an opportunity to *entertain their Melancholy*, and *divert their idle hours*, or to acquire the reputation of *Airy* wits and *Drolls*: if *He* be *their patron*, it is certain that *He* is the *Father of his Country*, and the *Head of the Church*; the *obligations* he hath to these are so *great* and so *near unto him*, that these little *Engagements* must give place thereunto: Nay, *He* hath herein been *Exemplary* to his *Subjects*, by withdrawing much of his *Encouragements*, and testifying frequently his *disesteem* of these *Experimental Philosophers*. Thus many of the *Nobility*, most of the *Physicians*, and other *understanding* and *serious* persons have either totally deserted the *Society*, or *discontinued* their presence at their *Assemblies*. And I could wish they would not *abuse* the World with *false Catalogues*, but give us a *true one* of such men as do *now frequent their meetings*, *keep correspondence with them*, and pay the *usual contribution*.

Having so great Presidents to justifie my *contempt* of *them*, methinks I need not apprehend the *censure* of those *Illustrious* and *Honorable personages* who might otherwise seem concerned in this *Quarrel*. The same *motives* which prompted them to advance the *Royal Society*, must now excite their *indignation* against them: the desire of advancing of the *Glory*, and the trading of *this Nation*, & of understanding *natural curiosities* engaged them in *this Society*; but now that these *men* have no way answered *their expectation*, since their *relations* and *Experiments*, are so *trivial*, *defective*, and false, since that the *Authors* of this

A I follow the English Edition of *Campanella*, and do recommend these places, especially the last *citation*, to every serious *Patriot* his consideration.

this fatal History have more in them of *Campanella*, than of Mr. *Boyl*; since they have relinquished the *original designs*, and *deviated* so notoriously from the intention of the *Royal Founder*, and what those *Eminent persons* purposed, who *first* closed with *them*: I will not think *them* any more involved in this *contest*, than *patrons* are where *their favours are abused*. And I protest that I bring with me all the *respect* and *Honor* in the world for those *persons of Honor*, who in so *dissolute an Age* gave the world that testimony of their *generous intentions*, which was to design the *improvement of useful knowledge* by these men: And I am concern'd to see their *Gallantry* so abused, so that nothing *exasperated my peace more* than a *resentment for their Honor*: Had the *Experimental Philosophers* acquitted themselves in *their trust* better, yet ought I to have been *commended* for *animadverting* upon these *Books*: the *notorious untruths* and *Errors* against *common Literature* were such, that *Foreiners*, who inquire into the *Writings* and *transactions* of these *Comical Wits*, would have concluded that we were *universally* degenerated into the old *British* ignorance, and that the *Bards* once more swayed in *this Land*: But I have taken off from the *generality of this imputation*; and dare presume that those that were no more than *Honorary Members* (and consequently not concerned in the *private* contests and *suits* of the *Corporations* they *so* stand related unto) will express a kindness for my *performance*.

Having thus excused my self to the *persons of Honor*, I shall briefly say something to those of *unquestionable Learning* that reside amongst the *Society*: I am sorry to finde *them* there, and that I must accommodate to their *worth* that Ancient saying, *Ingenium Galbæ male habitat*: their *number*, and *interest* seems so small there, that this *History* could pass with *applause*, notwithstanding *them*, and Mr. *Glanvil* be commended: with what *credit* can they resort unto the meetings of these *Comical wits*, whose *ridiculous actions* reflect upon *them*, and upon which *Assembly* to bestow the *Elogies* of the *Learned*, or *Vertuous*, 't would be as improper in an *Aristotelian*, as to denominate an *Æthiopian* to be *white* because of his *Teeth*? He must

be

be *insensible of all merit* that can derogate from Sir *Robert Murray*, Dr. *Wren*, or Dr. *Wallis*: and to suspect that the truly Honorable and *inquisitive* Mr. *Boyle* would abet a *design* that should subvert *piety*, and the *Protestant Religion*, doth not become any that knows *him*, or his *Writings*. But since *good men* are often-times made use of to *pernicious* ends, and *unwittingly* become *instruments* of the *basest frauds*; since none are to judge of *Affairs* by *their tendencie*, and not by the persons that *openly* manage *them*, I doubt not but even *these persons* and *others* of *integrity* and *solid worth* will not imagine themselves concerned in the maintenance of those *Errors*, which they cannot *approve* of, and every one knows *they could not commit*, nor *hinder*.

I have been thus large in the *Preface* to remove all *umbrages* and *misconstructions* to which this *undertaking* might subject *me*: the *Preface* also against Mr. *Glanvill* may seem a little *prolix* in comparison of the *subsequent Discourse*; but the *Specimen* being lodged at *London*, partly in *transcribing*, and partly because that the distance of the *Term* made the *Edition* less *seasonable*, I thought fit to inlarge that *Preface* much during my stay at *Bathe*, and to annex those other *Observations* made there, and what else is taken out of the Disputations of *Vander Linden* about the *Circulation of Blood*, which Book I could not procure the *sight* of before.

There be many defaults in the Language, and *connexion* of *passages* which may be liable to some *censure*: But whilst the *Body of my Discourse* stands firm, the advantages which the *Comical wits* shall derive from those *peccadilloes* will not be much: especially when I shall plead that the work was written amidst the *heat* of my *practice*: that the papers were not written, nor any discourse finished at *one time*, but with *frequent interruptions*: that the several *parcels* and *fragments* were sent to sundry *Learned* persons to experiment their *judgment*; that they were *joyned together* with some *alterations* and new *connexions*, without any review *of mine*, at *London*: several *additions* being to be inserted, as they came into my mind, in divers places, and so transmitted by the *post*: which occasioned

great

great trouble: in fine, had not some publique spirited *Gentlemen* there undertook to translate the *Italian* pieces, and to see the work *transcribed*, and the *insertions* made, and the *connexions* in some measure supplied, I could never had leasure to finish my intendments.

After this piece there shall follow the next *Term* (if God give me leave to perfect what is almost finished now) *A Vindication of* Aristotle *from the calumnies with which* Mr. Glauvill *hath aspersed his person*, in his Letter which is joyned to the Edition of his *Scepsis Scientifica*, which bears the *Arms* and is *dedicated* to the *Royal Society*, : as *as he repeats again* and *again* the *same* things, so *he* is still the *same illiterate person* : having never so much as read over *Diogenes Laertius*.

There are also *three Letters* of *mine* which may at some time or other become *publique*. The *first*, to a *person of Honor* and Member of the *Royal Society*, shewing how my writing against these *Comical Wits* doth not derogate from the *persons of Quality* who are *Honorary Members* of the *same Assembly* : especially since *they* have acted so much contrary to the intentions of those *illustrious Patriots* that at first encouraged *them*; there are the passages of *Campanella* set down, and *commented* upon. & the third part of the *History of the Royal Society* animadverted upon, as bring directly subservient to *his Propopoſals* for the restoration of *Popery*, with some accessional Characters, which Mr. *Sprat*, and Mr. *Glanvil* bestow upon the *useful University* Learning.

The second, to a *person of Honor*, no Member of the *Royal Society*, shews, that it is *impossible* to arrive at any *exact Science* in *Natural Philosophy*; that if it were possible, yet these *Comical Wits* and their *Method* could never atchieve it : I shew here the *negligence* in making *observations*; their *falshood* in relating them : that they either are *ignorant* of what is published by *Antient* and *Modern Writers*, or most *egregious plagiaries* : that the *Aristotelians* and *Galenists* were never enemies to *Experiments*, but cautious about *concluding* any thing *rashly* from them, or making such as were unsafe and inconsistent with a *good conscience* : and that the *Experiments* recorded by the *Galenists*

Here I further pursue Mr. *Sprat* for the mistakes against common Literature, with which the History abounds.

lenical Physicians infinitely surpass as to *Physick*, and even *Natural Philosophy*, what ever these *Comical Wits* can pretend unto. I add, that the *deep* study of *Natural Philosophy* is not *requisite*, but rather *destructive* to all *Polities*, (as appears by *History*) neither is that or the *Mathematicks* necessary to the improvement of *Manual Trades* and *Arts*, since those *Countries* where *Philosophy* and *Mathematicks* have been *generally ignored*, (as in *Asia*, and during the times of the *Romans* luxury) *Mechanical Artisans*, and such Manufactures have *most flourished*: that the *Luxury* which is now in *fashion* hath nothing in it that may compare with the *ingenuity* of the Antient *Vertuosi*: that those of old *Rome* did make an *Icarus* to fly, and in his flight to fall down and besprinkle *Nero* with his Blood; whereas our *Fopps* have been these many years studying how to flie, yet have not so much as effected the most facile part of the attempt, which is, *to break their necks*.

The third is to a learned *Physician*, shewing the damages *our Faculty* hath sustained by these *impertinents*: the condition of *Physick* and *Chyrurgery* as it is at present by reason that the *Divines*, *Mountebanks*, *Quacksalvers*, *Apothecaries*, and every rude *Experimentator* countenanced by the *principles* and repute of these *Virtuosi*, all *practise it*: the inconveniences to the *Monarchy* thereby are considered, and the unreasonableness of what the *Virtuosi* alledge, as also the *vanity* of sundry of their *Experiments* (besides what are *old*, and *impudently* obtruded on *us* for *new*) is demonstrated.

And if there be any person *worthy of my indignation* that will justifie the *Rhetoricalness* of the *History of the Royal Society*, I will write a fourth about *that*, shewing that *choice of words*, and a *smooth* and *numerous period* is not *compleat Eloquence*; but if the Subject-matter be *foolish* and *irrational*, 'tis a sort *of madness* in the judgment of *Tully*: and that if all the instances of *puerile* & *jejune Eloquence* were lost, which are recorded by *Seneca* and *Quintilian*, I protest I could supply a great part of *that damage* out of this famed *History*: and if any fitting *Adversary* declare hereupon, I will make these *Comical Wits* as much renounce the *Antient Orators*, as they do now the *Philosophers*.

I ſhould here put an end to this *Introductory* diſcourſe, but that 'tis fitting the world ſhould know how not only *illiterate*, but *mean-ſpirited* theſe *Vertuoſi* are: when I declared that I would *animadvert* upon Mr. *Sprat*, and Mr. *Glanvill*, theſe *Comical wits* not only intimated to *me*, but in all places divulg'd that if I attempted any ſuch *thing*, they would appoint ſome *ingenious men of their number* to write *my Life*, thinking hereby to *terrifie* me, and make me fear their *Satyres*, who deſpiſed their *Learning* and other *abilities*. The effect of *this their project* was ſuch, that I found *all perſons of Honour* and *ingennity* to condemn it *univerſally*: pitiful *Mechanicks*, that being ſo ridiculous already, multiply occaſions of further *contempt*! The courſe is uſual amongſt the *Papiſts*, and *therefore* leſs to be admired or ſtrange in theſe *Virtuoſi*. When the Biſhop of *Spalato* writ his excellent Books againſt the *Romaniſts*, they anſwered him by *calumniating* his *life*: when *Padre Paolo* writ the *Hiſtory* of the *Council* of *Trent*, the Jeſuit *Palavicini* begins his *Anti-Hiſtory*, with a long debate, wherein he attempts to prove that the *Author* of the ſaid *Hiſtory* was an *Heretique*, and *Atheiſt*. This procedure of his hath been *laughed* at every where, and *Cæſar Aquilinius* a *Papiſt*, thus cenſures it.

Cæſar Aquilinus de tribus Hiſtoricis Concilii Tridentini, p. 18, 19, 20.

"An *Petrus Soave* fuerit Hæreticus an Atheus? *Queſtionem hanc proponit* Henricus *initio præfationis ad ſuam* Cenſuram, *loquens enim de* Petro Soave, *hæc addit*, Scriptor Hæreticus an Atheiſta? *nihil oportet inquirere: quare ipſe Quæſtionem hanc ut ſuperfluam contemnendam potius quam examinandam & determinandam judicat.* Palavicinus *vero exiſtimans ſtatim uno ictu adverſarium, atque ejus* Hiſtoriæ *ſternere autoritatem, Quæſtionem iſtam proponit, & ſolvit, aſſerens in primo introductionis ſuæ limine* Petrum Soave *fuiſſe* Hæreticum, *& quod pejus eſt*, Atheum: *hoc etiam addit ſecundi voluminis initio in epiſtola quam tribuit ſui operis* Bibliopolæ. *Probat hoc ex quibuſdam verbis Manu-ſcriptarum epiſtolarum, quæ juxta ejus ſententiam* Petro Soave *tribuuntur.* Verùm ſatis ſultè videtur incedere, & aſſimulatur ei, qui umbram inſequitur relicto corpore: *habet præ manibus* Hiſtoriam Concilii Tridentini *ſcriptam ab illo & typis datam, in qua tanquam in ſpe-*

culo

"culo posset cognoscere, quænam sit Petri Soave Religio. An Ca-
"tholicus, an Hæreticus? An fortasse Atheus? & laborat a-
"pud nonnulla privata manu scripta, quæ vel vera non sunt, vel
"certe ancipitis expositionis. —— Primus igitur Palavicini
"istus satis vanus & inutilis est, & ipse videtur assimilari ho-
"mini, qui cum non valeat suis viribus inimicum vincere, utitur
"clarioribus, & maledicis vocibus: debuisset solum respondere
"ad oppositа, quæ in illius Historia inveniuntur, & non lacessere
"hostem injuriis & imitari prudentiores, ac Sanctos Scriptores
"adversus Hæreticos, qui relictis injuriis tantum eorum doctri-
"nam confutant ac damnant. ——

In fine, I was so far from being daunted at *those rumors* and *threats*, that I enlarged much *this Book* thereupon, and resolved to charge the *Enemy* home, when I saw how *weak resistance* I should meet with. I knew that *recriminations* were no *answers*; and that a *sober vertue* needed not to stand in fear of any *aspersions*. I understood well that the passages of a *life* like *mine*, spent in *different* places with much *privacie* and *obscurity*, was *unknown* to *them*; that even those *actions* they would fix their greatest *calumnies* upon, were such as that they understood not their *grounds*, nor had they *learning* enough and *skill* in *casuistical Divinity* to *condemn*: that it would be *imprudent in them* to look beyond the *Act* of *Indemnity* and *Oblivion*, which was more necessary to many of the *Royal Society* than to me; nor can *their deportment* be *justified*, as *mine*, who joyned with *no party*, frequented no *Conventicles*, writ very *honorably* concerning the *Episcoparians*, and pleaded for their **Toleration*: I was at *Westminster-School* when the late *King* was *beheaded*: I never took *Covenant*, nor *Engagement*. In sum, I SERVED MY PATRON; I endeavoured to express my *Gratitude* unto *him* who had *relieved me* being a *Childe*, and in great *poverty* (the *Rebellion* in *Ireland* having deprived my Parents of all means wherewith to *educate* me) who made me a *King's Scholar*, preferred me to *Ch. Ch. C.* in *Oxon.* who often supplied me with money, when my *tender years* gave him little hopes of *any return*, and who protected me amidst the *Presbyterians* and *Independants*, and other *Sects*, with none thereof did I

'Tis a kind of *Impiety* to disturb the buried: and oftentimes the exposing of things to the Air that have been long kept *close*, or the *opening of Tombs*, hath raised vapours so *pestilential* that they have almost *ruined flourishing Kingdoms* and *Seigniories*.

* See my preface to the *Good Old Cause*.

contract any *relation* or *acquaintance*: my *familiarity* never engaged me with *ten* of that *party*, and my *genius* and *humor* inclined me to *fewer*. *I* neither *enriched*, nor otherwiſe *advanced* my ſelf during the *late troubles*, and ſhared the common *odium*, and *dangers*, not *proſperity* with my *Benefactor*. *I* believe no generous man, who hath the leaſt ſenſe of *bravery* will *condemn me*; and *I* profeſs, *I* am aſhamed rather to have done *ſo little*, than that *I* have done *ſo much* for *him* that ſo *frankly obliged* a *ſtranger*, and a *childe*. When *Gracchus* was put to death for *ſedition*, that faithful friend and *complice* of *his* was *diſmiſſed* and mentioned with *honour* by all Poſterity; who when he was impeached, *juſtified his Treaſon* by the avowing a *Friendſhip* ſo great, that whatever *Gracchus* had commanded him, he would not have declined it: and being further Queſtioned, *Whether he would have burned the Capitol at his bidding*? He replied again, *That he ſhould have done it*; *but* Gracchus *would not bid ſuch a thing*. They that knew *me* heretofore, know I have a *thouſand times* thus apologized for my ſelf: adding, that in *Vaſſals* and *Slaves*, and perſons *tranſcendently obliged*, their *Fidelity* exempted them from *all ignominy*, though the principal *Lords*, *Maſters*, and *Patrons* might be accounted *Traytors*. And *I* am ſo far from dreading the *Cenſure* of the *world* (eſpecially from *Cavaliers*) that *I* believe moſt men wiſh their favours ſo well placed, and that in their *exigencies* they might meet with as *brave* acknowledgments. My *Youth* and other circumſtances *incapacitated* me from rendring him any great *Services*; but *all that I did*, and *all that I writ*, had no other aim than *his intereſt*; nor do *I* care how much any man can *inodiate my former Writings*, as long as that they were *ſubſervient* to *him*.

* * *

I think this defence to be the moſt *proper* and *ſeaſonable* that I can now make; and *I* will not ſuffer my ſelf to be engaged in any *Diſputes* that may contribute to the *diſſettlement* of this *Nation*, and *Monarchy*; it will therefore be but meanly done to

to *aſſault* what *I now abandon*; and to revive the *mention*, nay, perhaps to contrive *any anſwer* (after ſo many years omitting it) is ſcarce *prudential*. *I* have been *confirmed* by the *Right Reverend father in God* the Lord *Biſhop* of *Wincheſter*, and they that would write *my life well*, muſt conſult that excellent *Prelate*, and a Letter which *He* hath of *mine*: *I* have lived in *Communion with the Church of England hitherto*, as ſtanding upon the foundations laid by Qu. *Elizabeth*; and my neighboring *Dioceſans* of *Worceſter* and *Lichfield* can certifie with how much reſpect I have demeaned my ſelf *to them* upon occaſion; and *I* abhor all *thoughts* but ſuch as ſhall contribute to the *ſupport* of the *Monarchy*, the *Proteſtant Religion*, the *Honor* and *welfare* of *theſe Kingdoms*. Having made this Declaration, let them (or more able men than *they*) write againſt any piece of mine which hath been publiſhed ſince his *Majeſties reſtoration*, and conſider the *manner of my aſſertions*; and let them write the life of a *man* who hath *ſome vertues* of the moſt *celebrated* times, and hath reſerved himſelf free from the *Vices of theſe*, *I* ſhall not regard their malice, nor value the *indulgence* of a ſort of people whoſe credit (ſince the Anſwer to Mr. *Sorbier*, the *Hiſtory of the R. S.* the *Calumnies* againſt *Ariſtotle*, and the *Plus Ultra* of Mr. *Glanvill*) cannot equal that of *Amadis de Gaule*, King *Arthur*, *Timæus*, or *Schioppius*. All that *they* ſhall ſay of this *nature* will be *notorious*, and *illiterate malice*; and my Reply ſhall be a *ſcornful ſilence*.

I ſhall add now, that in ſuch times as I thought it *our intereſt* to ſubvert the *Monarchy* of *England*, and the repute of the *Clergy*, I was paſſionately addicted to the *new Philoſophy*, and motioned ſeveral ways for the introducing it amongſt the *Gentry* and *youth* in this Nation; I was confident that it would render all the *Clergy* contemptible, and take from their *eſteem* and *reverence* in the *Church*, whilſt they muſt ſeem *egregious fools* in matters of *common diſcourſe*; nor did *I* queſtion but the *Authority* of all *Antiquity* in ſpiritual affairs would vaniſh when it appeared how much they were miſtaken in the *common occurrences* and *Hiſtories of Nature*. How rational this opinion of *mine* was, and how it is verified in theſe days, let the *Hierarchy* and *Univerſities* judge.

To

To the two famous *Univerſities* of this Land, *Oxford* and *Cambridge*, the *Chancellors*, *Vice-Chancellors*, *Heads* of *Colledges* and *Halls*, *Profeſſors*, *Fellows*, and *Students* in the ſame.

Reverend *Fathers* and *Gentlemen*;

THe *goodneſs of the* Quarrel *I am engaged in makes me fear no* Judges; *but yet to chuſe the moſt* competent: *I am* ſecure *of the honeſt and* true; *but ſubmit the* deciſion *to the* learned *and* prudent. *All that are ſenſible of thoſe* ſtudies *by which the* Morality, Religion, *and* Civil Policy *of this* Nation *hath been carried on* happily *before theſe* Impertinents & Innovators; *and how* this Nation *is declined and* debauched *from every thing that is* ſerious *and* ſober *now*, *are convinced of the* juſtice *of* my complaints, *and how* neceſſary *it was that* ſome body

body *ſhould attacque* them ; *but it is for* you *to determine of the* validity *of my* charge, *and of thoſe* proofs *with which I come to implead* them. *I am not* troubled *at the* glorious Titles *with which theſe* Comical Wits *boaſt themſelves ; Of the* Lyons *which they* bear, *they have only* this *faint* reſemblance, *that* they are not ſo brave as they are painted *I have ſtooped the* Talbots (*your* Supporters) *for* them, *and if they ever* hunt well *hereafter*, this Age *knows* whom *they are* obliged *unto. The name of* Virtuoſo *ſignifies as little with me, as it does in* Italy, *where they will beſtow on a* Paſtry-Cook *or* Millener, *even with that* fair *acceſsional of* molto Illoſtre; *But it ſeems a little too* open *and* palpable *to fetch the* project *of the* Society *from* Italy, *and their* name *too : though* Campanella *contrived the* former, *yet would* He *not have adviſed* them *unto the* latter ; *and if*

their

their invention were ſo barren *as not to ſuggeſt unto* them *a fitting* denomination, *they might without robbing* meaner Artizans, *have borrowed* one *from the* Academy *of* Perugia, *or ſome where elſe there, and ſtiled themſelves the* INSENSATI, &c. *It is manifeſt now that the* Antient Learning (*and not only the* Natural Philoſophy) *is the* Rubbiſh they would remove; *This work they have ſo diligently purſued, as if they had forgot* "*Their* firſt and chief Employment, "carefully to ſeek, and faithfully to "report how things are *de facto* —— *This* Specimen *acquaints* you *with what* integrity *they perform their* undertakings; *and if the* Enſamples *they exhibite to the world, whilſt* They *are yet* probationers *for the glory of* Natural Philoſophers, *if they be ſo* faulty. *What* eſtimate *may we* rationally *make of thoſe that are laid up in the* Treaſu- Mr. *Glanvil.* pag. 91.

ry *of their* Archives? Mr. Glanvill *tells us, that* "They have done more "than all the Philoſophers of "the notional way, ſince *Ariſtotle* "opened his ſhop in Greece: which "ſaying (*he adds*) may perhaps look "to ſome like a bold and fond ſen- "tence; but whoſoever compares the "*Repoſitory* of this *Society*, with all "the volumes of the Diſputers, will "finde it neither immodeſt nor un- "juſt; and their Hiſtory hath given "us inſtances ſufficient of their *Ex-* "*periments* and *Obſervations*, and *In-* "*ſtruments* to juſtifie a bolder affir- "mation. ----- *I am indeed apt to be-* *lieve that all the* Philoſophers *of the* notional way *in* Greece, Alexandria, *Arabia*, Spain, *and the reſt of* Europe, *neither have, nor would have attempted any thing* like to what they have done; *and when I reflect upon the lamentable narratives and propoſals which their Hiſtory,*

pag. 90.

I ſhall hereafter give the world an examen of the reſt of the hiſtory: and I, deſign to try them by that piece.

History, the Transactions and other Books of theirs represent unto us, I think they purpose to grow famous, as the Turks *do to gain Paradise, by treasuring* up all the waste paper they meet with. *But I shall not anticipate* your censure, *nor endeavor to prepossess* you *against* them *by the sense of* your interest, *nor exasperate* your passion *any way: Be as* unbyassed *as it is possible; Be as* Loyal *and* Monarchical, *as any* English-man *imaginable; Be as great* friends *as* you *can to the* Protestant Religion, sober vertue, *and the* real Honor *and* utility *of* these Kingdoms; *I wish for* such Arbitrators; *and your* Sentence *shall never be declined upon* those accounts, by

Warwick *Octob.* 6. 1669.

Your affectionate humble Servant.

Hen. Stubbe.

A

Specimen of the *Animadverſions* upon the Hiſtory of the *Royal Society.*

EPicurus and thoſe of *his followers* which declined the (*a*) entermedling with ſuch employments as related unto the *Government* of their *Countrey* and *Civil Policie*, did agreeably to *their* inclinations and principles, ſlight and vilifie all that παιδεία or (*b*) *courſe of ſtudies* conſiſting of *Grammar* (which in its extent included all *Critical Learning*, *Hiſtory* and *Chronology*) and *Rhetorick*, and *Logick*, and even *Mathematicks*. That great *Epicurean Philoſopher Metrodorus* had the confidence to (*c*) write unto one, that *whereas he was ignorant of the firſt Verſes in* Homer, *and underſtood not whether* Hector *were a* Trojan *or a* Grecian *Commander, nor any of thoſe things almoſt which were the ſubject of common diſcourſe and knowledg, yet he ſhould not be* troubled *thereat.* We have ſeen in *this Age* not only the *Philoſophy*, but the *Ignorance of that Sect* revived, but with this *diſparity*, that wheras the *former Epicureans* did own & avow their being *unacquainted* with that ſort of *Literature*, our *Modern Inſolents* pretend to underſtand *it* in ſuch perfection, that the *Empire of Learning* as well as of *wit*, and *ſolid Philoſophy* ſhould ſeem included in the *ſame walls.* But how *vain* ſuch their *pretenſions* are, and how juſtly I charge *them* with the *imputation* of *ignorance*, is apparent to any that are converſant with the *Books* that wear *their Name*, and by their *ordinary Diſcourſes.* I ſhall vindicate my *Cenſure* by inſtancing in *thoſe pieces* which had more than one *Comical Wit* to pen *them*, and *which* if they be not the moſt *elaborate* & *ſubſtantial* that it is poſſible for *that ſort of men* to produce, the world muſt ſuſpect henceforward *their diſcretion*, as much as now their *abilities.* The *Hiſtory* was *many years* in writing, and the *Author* aſſures us, he had no *mean aſſiſtants* in that work: Mr. *Glanvill* wanted not a *convenient*

(*a*) Vide Diog. Laert. l. x. & notas *Menagii* pag. 275. Vid. *Diog. Laert.* ubi ſupra. *Menagii* notas pag. 260. 274. & *Voſ.* de Phil. Sect. c. 8 *Sect.* 2, 3, 7.

(*c*) *Plutarch.* in libello *quod non poteſt ſuaviter vivi ſecundum Epicurum.*

ſpace

ſpace of time to perfect his *Plus ultra*; he conſulted with ſeveral of the *Virtuoſi* for materials wherewith to advance their *Renown*, and ſilence not only his *opponent*, but all *oppoſites* againſt the *Royal Society*. I know ſome that *he* writ unto about it; and others ſaw *his papers* as they were remitted unto him, *blotted* and *altered*. The reſult of all which *their care* and *pains* is, that whereas *ſome* only *imagined* that *theſe men* were a company of *talkative* and *ſuperficial* —— now it is become *paſt denyal* by any body. Who can with *any patience* read how this famous *Society* ſent to the Governor of *Batavia* in the *Eaſt-Indies* to know what grows in *Mexico* in the *weſt-Indies*? How poor and mean are their *inquiries*, not ſuch as *ſerious men* deſign to erect a *Natural Philoſophy* upon, but to yield *empty fellows*, and the *Impertinents* matter for *Table-talk*! Juſt ſo when I went to *Jamaica* and deſired that Honorable Perſonage Mr. *Robert Boyle* to procure me *ſome directions* for *Philoſophical* inquiries in *that Countrey*; He, with *bluſhing and diſorder*, tendered me from *them* a *ridiculous* paper which concerned moſt ſome particularities of *China*, and thoſe *Oriental* parts: Had not that paper been *loſt*, I would have printed it; but if *they* pleaſe to remember *it*, it is about *half a ſheet of Inſtructions* given to an *Eaſt-India* Captain, and beyond any *Almanack* were to ſerve for all *Meridians*, and *Countreys*, though the enquiries were *ſpecialities*. I can ſcarce endure to hear Mr. *Sprat* tell us, that the *graver and more reſerved Ægyptians did confine their Philoſophy to their Temples*. There is a great noiſe made by ſome concerning the antient *Hieroglyphical* Learning of the *Ægyptians*; but I never heard that it was *confined* to their *prieſts* by the *graver Authority*; but rather that a company of *cheating lying Rogues* did make *fools* of the *people*, and by pretences of a *ſacred* and *myſterious Character* amuſed them: they had little of *Natural Philoſophy*; ſomewhat more of *Geometry* and *Aſtronomy*: all their *Knowledge* amounted not to much, as *Conringius* hath (*d*) demonſtrated; and after that the Suceſſors of *Alexander* had ſetled themſelves in *Ægypt*, that *foppery* decayed, & the grave *Ægyptians* at *Alexandria* endowed the profeſſors of *Phyſick* and ſundry *Philoſophies* there, (the place or Colledge

pag. 179.

Pag. 7.

(*d*) *Conringius de Medicin. Hermetica.*

was

was called *Museum*, *Strabo lib.* 17.) and erected *Libraries*, and furnished the *Roman* Empire with *Physicians* to the days of *Valentinian*, and (*e*) *Domitian* with Books. But it were *unpardonable* in a common *School-boy* to pass by the *Jonique* and *Italique Philosophers* un-mentioned; and to tell us, "*That in* Greece *the most considerable* (*and indeed the only successful*) *trials* "*were made at* Athens? Whereas, if we regard *Natural Philosophy*, and abstract from the Experiments of the *Aristotelians*, there was never any thing in *Athens* could compare with the discovery that *Thales*, *Anaximander*, *Anaximenes* and *Anaxagoras* made, which were of the *Jonique* Sect: and since the *Dialect* in which he *writ* (not the place of his Nativity) authorizeth me to do it, I shall reckon *Hippocrates* amongst the *Jonian* Philosophers, and Mr. *Sprat* may be certain *he* is not to be accounted for in *Athens*. And as to the *Italique* and *Eleatique* Sects, dare any man say *they*, that they were inferior to *Athens*, or that their trials were *unsuccessful*; who knows the performances of *Pythagoras*, *Empedocles*, *Acron*, *Parmenides*, *Melissus*, *Leucippus*, *Democritus*, *Ocellus*, *Lucanus*, *Archytas*, *Archimedes*, &c? At *Alexandria* (a place we may not improperly reckon in *Greece*, since not only Mr. *Sprat* omits the mention of those Professors as *Ægyptians*; but they writ in *Greek*, followed the *Grecian* (*f*) account and customes, not *Ægyptian*; and as *Athenæus* shews (*lib.* 4.) taught *Greece* it self Philosophy and the *Liberal Arts*) if we remember that it was the seat of (*g*) *Euclid* the *Mathematician*, and there is scarce one *Mathematician* recorded but was related to *Alexandria* as *Vossius* shews. "*Valde autem illud commendat Scholam ab* Euclide *erectam* Alexandriæ, *quod non solum multos reliquerit discipulos*; *de quo auctor* Pappus *in septimo collectionum Mathematicarum*; *sed ab ejus tempore*, *usque ad tempora* Sarracenica.

e Domitianus —— misitque *Alexandriam* qui exemplaria describerent; emendarent. Ita discimus tempore *Domitiani* non caruisse Bibliotheca Alexandriam; nam semper *urbs illa* professores plurimos aluit. *Pagnin. Gaudent.* de Philos. apud Roman. c. 168. p. 456.

pag. 7.

I believe the *Cyrenaic Philosophers* in the Court of *Dionysius* made very *successful Experiments*: and their number is paralelled by *Lypsius* (if my memory fail me not) in his *Stoical Induction*, to any that *Athens* ever saw.

f Conring. de Med. Hermet. c. 12. pag. 152.

f Euclides Mathematicus floruit temporibus Ptolomæi Lagidæ, eoque regnante primus Alexandriæ docuit *Matheſin*: ut ex *Proclo* diadocho videre est. *Voss.* de Phil. Sect. c. 11. Sect. 1.

"cenica *vix ullum invenire sit nobilem Mathematicum*; *quin* "*vel patria fuit* Alexandrinus; *vel saltem* Alexandriæ *de*- "*derit operam Matheſi*. Voſſ. de Scient. Mathemat. c. 15. pag. "52. The ſame is avowed by Sir *Henry Savil* in his ſecond "Lecture. "*Poſt* Euclidem *enituit* Archimedes —— *&* E- "ratoſthenes. *Hos inſecuti* Apollonius Pergæus, Geminus, "Theodoſius, Menelaus *Geometra dicti*, *& alii ex Schola fere* "Alexandrinâ *profecti omnes*, *uſque ad tempora* Sarraceno- rum. There flouriſhed *Herophilus* and *Themiſon*, and *Dioſcorides*, and many other Profeſſors of *Phyſick*, *Ana- tomy*, and *Philoſophy* (even *Chymiſtry*, and the *Philoſophers- ſtone*) 'tis *extreme imprudence* to mention *Athens* thus! But, to gratifie him further than *he* deſerves or can expect; to yield that up to *Ariſtotle* and his *Peripatetick* followers in *Athens* which cannot ſeem due to ſuch as (*b*) ſpent their time *in idle talking and wandring under the fruitleſs ſhadows* of nature, in *their firſt inſtitution*, (*as their ſucceſſors have done ever ſince*) *and were utterly uſeleſs in reſpect of the good of man-kinde*. To grant our *Virtuoſo* more than the *walks*, *porches*, and *gardens* he prates of, do merit, what a ſtranger is *he* in the *Hiſtory of Philoſophy*, and how ignorant of the *Subject he diſcourſeth about*, not to know what *Dialects* the *Grecian* Philoſophers *writ* in, nor how *ele- gant* was their *ſtyle*? Some uſed the *Jonique*, others the *Do- rique* dialect, and thoſe *embaſed* ſeveral ways according as *their humors*, their *Countreys*, or the *novelty of the Subject* put them upon it: And even at *Athens*, neither the *Stoiques*, nor *Epicureans* were ſo ſolicitous about *Rhetorick*, as to chuſe that for *Philoſophy* which they could moſt *eloquently* expreſs. And ſince *Plato* had his λέξεις, and *Ariſtotle* his ἰδιολεκτα and other *terms* and *expreſſions*, 'tis hard to think that they did ſo regulate their *Philoſophy* by their regards to the *ornaments of ſpeech*, as Mr. *Sprat* imagines. How comes it to paſs then that our *Hi- ſtorian* intimates to us ('tis a "new *invention*! to give the *Ce-* "*mical Wits* their due, though fooleries) that the *Athenians* "*were the* (i) *Maſters of the Arts of ſpeaking to all their Neigh-* "*bours* [which is falſe concerning the *Jonians*, and probably "of ſome others] *and ſo might well be inclined*, *rather to chuſe* *ſuch*

Mr. *Sprat*. pag. 327, 817.

i Did the *Athe- nians* teach *Hippocrates*, or *Democritus* to

"*such opinions of Nature, which they might* "*most elegantly expreſs, than ſuch which* "*were more uſeful, but could not ſo well be* "*illuſtrated by the ornaments of Speech.*

write? did *theſe two ſhew* ſo great a care of *eloquent language* that they choſe their *Philoſophy* accordingly? Or did not the one in the *Ionique*, the other in the *Dorique* phraſe joyn many *words* and expreſſions thereby to deſcribe their *Philoſophical ſentiments.* Read over, Oh! *tres-haute & tres-agreable virtuoſi* Diogenes Laertius, & *Voſſius* before you tell theſe Stories.

Mr. *Sprat* further *informs* us, (and who can deny him to *glory* of being the firſt *diſcoverer*?) that "*in the City of* Athens "*the knowledge of Nature had its Original* "*before either that of Diſcourſe, or of hu-* "*mane Actions.*—— This is notoriouſly falſe; for it is mani- pag. 8.
feſt that *Anaxagoras Clazomenius* firſt brought from *Miletum* news of *Natural Philoſophy* to *Athens*, teaching it to *Pericles* and *Euripides*: and before *that time* there were *Orators*, and Moral *Philoſophers*, as certainly as ever there was a *Solon*, or (*l*) the *Sophiſta* at *Athens*.

k Voſſius de Phil. Sect. c. 5. Sect. 7.

l Iſocrat. in orat. περὶ ἀντιδόσεως.

I muſt profeſs here in the *Introduction* that 'tis *an hard thing to write againſt men that underſtand nothing*: and that it is not my preſent intention to manifeſt *all* thoſe miſtakes againſt *common reading* and *Literature*, which are in that *Hiſtory*. I ſhall inſiſt *now* but on *ſome*, but ſuch as are ſo *groſs* as to juſtifie the moſt harſh of *my cenſures*, and to gain a belief from my *Reader*, that thoſe *who could not prevent theſe faylors* may be guilty of an infinite more. I appeal unto my *Reverend* and Learned School-Maſter Dr. *Busby* at *Weſtminſter*, whether he, or any other Learned man, would have admitted of, much leſs have *applauded* ſuch an *Exerciſe* as Mr. *Sprat* offers to his *Majeſty* by way of *Dedication*? Do a few *empty* though *ſmooth-placed words* make up *all Rhetorique*? Is this *Nation* ſunk *ſo low*, that *non-ſenſe* and *ignorance* can be *voiced* for the moſt *Exemplary Eloquence* that late years have publiſhed? *Oratio, ſi res non ſub-* Cicero de ora-
eſt ab oratore percepta & cognita, aut nulla ſit neceſſe eſt, aut om- tor. l. 1.
nium irriſione ludatur. Quid enim tam furioſum, quam verborum vel optimorum atque ornatiſſimorum ſonitus inanis, nulla ſubjecta ſententia aut ſcientia? The Epiſtle follows, and is *this*.

The Dedication of the History of the Royal Society unto his Majesty.

To the King.

SIR,

OF all the *Kings of* Europe, *Your Majesty was the first, who confirmed this Noble Design of* Experiments, *by Your own Example, and by publick Establishment. An* Enterprise *equal to the most renown'd Actions of the best* Princes. *For, to encrease the Powers of all Mankind, and to free them from the Bondage of Errors, is greater Glory than to enlarge* Empire, *or to put Chains on the Necks of Conquer'd* Nations.

What Reverence all Antiquity *had for the* Authors *of* Natural Discoveries, *is Evident by the Diviner sort of Honor they conferr'd on them. Their Founders of* Philosophical Opinions *were only admir'd by their own* Sects. *Their* Valiant Men *and* Generals *did seldom rise higher than to* Demy-Gods *and* Heroes. *But the* Gods *they Worshipped with* Temples *and* Altars, *were those who instructed the world to* Plow, *to* Sow, *to* Plant, *to* Spin, *to* build Houses, *and to find out* New Countries. *This Zeal indeed, by which they express'd their Gratitude to such Benefactors, degenerated into Superstition: yet has it taught us, that an higher degree of Reputation is due to* Discoverers, *than to the* Teachers *of* Speculative Doctrines, *nay, even to* Conquerors *themselves.*

Nor has the True God *himself omitted to shew his value of* Vulgar Arts. *In the whole History of the First* Monarchs *of the world from* Adam *to* Noah, *there is no mention of their* Wars, *or their* Victories: *All that is recorded is this, they liv'd so many years, and taught their Posterity to keep* Sheep, *to till the* Grounds, *to plant* Vineyards, *to dwell in* Tents, *to* build Cities, *to play on the* Harp *and* Organs, *and to work in* Brass *and* Iron. *And if they deserved a* Sacred Remembrance *for one* Natural *or* Mechanical Invention, *Your Majesty will certainly obtain* Immortal Fame, *for having established a perpetual Succession of* Inventors.

I am, &c.
THO. SPRAT.

Animadverſions upon the Epiſtle *aforeſaid.*

IT is a ſign that our *Virtuoſo* is little acquainted with the condition of *Europe*, and that the Intelligence of theſe *Curieuſe* is as bad or worſe than ever deceived the *Man of Stagyra*, in that he ſays, that *of all the Kings of* Europe *his Majeſty was the firſt, who confirmed this Noble deſign of Experiments by his own example.* —— Had not the Emperor *Rudolphus* a Colledge of *Chymiſts* to promote *Natural* and *uſeful Experiments* in *Phyſick* and *Philoſophy*, did he not oftentimes *work* himſelf in thoſe *Laboratories* where they had *Rulandus* and others for his aſſiſtents? take the teſtimony of one that was *preſent* with him: *Nec attinet ſuperiorum annorum Imperatores, Principes, & totam Nobilium familiam citare; cum manifeſtiſſimum ſit, multum ſtudii, laboris, diligentiæ atque ſumptuum in nobiliſſimam hanc artem* [Chemiæ] *collocaſſe Auguſtiſſimum noſtrum Cæſarem* Rudolphum *adducere licebit, quem publica fama paſſim conſtat, artem hanc Alchemiæ impenſe amare, artificiumque ſtudioſe de his exquirere, non raro ipſa* Chymica *aggredi, tractandaque nec dedignari.* —— Did not *Alphonſo* the laſt King of that name in *Naples* try many *Experiments* in his *Gardens*? and when he poorly abandoned his Countrey and Riches to the *French*, did he not (admire him, O ye *Comical Wits*!) did he not with ſeveral *choice Seeds* remember to ſhip ſome excellent *Bottles of Wine*, and ſo retired to *Sicily*? Did not King *Charles* the Firſt encourage and aſſiſt Dr. *Harvey* in the Diſquiſitions about the *Circulation of the Blood*, and *Generation of Animals*? Hath not there been at *Florence* an *Academy* for *Experiments in all manner of Philoſophy* promoted and kept on foot by the *Ducal Family*? Is there not, by the encouragement of the *Popes*, a *Laboratory* and Colledge of *Jeſuits* at *Rome*, whoſe great work hath

Mr. de Silhon in the ſecond part of his *Miniſter of State*, diſc. 7. obſerveth, but commends not the *Emperor Rudolphus*, in that he made a *Shop* and *Forge* of his Cabinet, and reduced all his *Imperial* thoughts into the ſearch of the Philoſopher's-ſtone, and to make *Watches* and *Dyals*.

Martin. Ruland. in dedic. ad progymnaſm. *Alchemiæ.*